

# TELECOM CHURN PREDICTION & BUSINESS RECOMMENDATIONS

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By : Rocky Ranjan

# PROBLEM STATEMENT

❓ Why is churn a problem?

- In the **telecom industry**, customers can easily switch between providers.
- The **annual churn rate** is **15-25%**, leading to revenue loss.
- It costs **5-10 times more** to acquire a new customer than to **retain an existing one**.

📌 **Project Objective:**

- Predict which high-value customers are likely to churn.
- Identify key behavioral indicators of churn.
- Help telecom companies reduce churn using data-driven strategies.

# UNDERSTANDING CHURN IN TELECOM

Types of Churn:

- Postpaid Customers:** Notify the company before switching (easy to track).
- Prepaid Customers:** Stop using the service without notice (harder to track).

## 📌 Definition Used in This Project:

- Customers are considered churned if they haven't used calls, SMS, or data in the last month.

# DATASET OVERVIEW

- 📌 **Data Source:** Customer data over 4 months (June to September).
- 📌 **Number of Records:** 99,999 customers, 226 features.

Key Attributes in the Dataset:

- 📞 **Call Usage:** Total outgoing & incoming call minutes.
- 🌐 **Data Usage:** 2G & 3G mobile data consumption.
- 💰 **Recharge Behavior:** Monthly recharge amounts.
- 📈 **Customer Engagement Trends:** How usage changes over time.

[2]: (None,

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2	6/30/2014	7/31/2014	8/31/2014	
3	6/30/2014	7/31/2014	8/31/2014	
4	6/30/2014	7/31/2014	8/31/2014	

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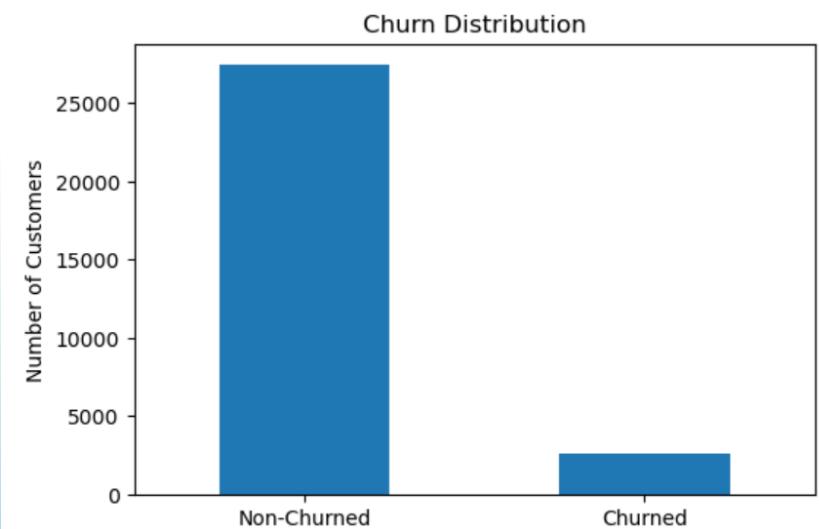
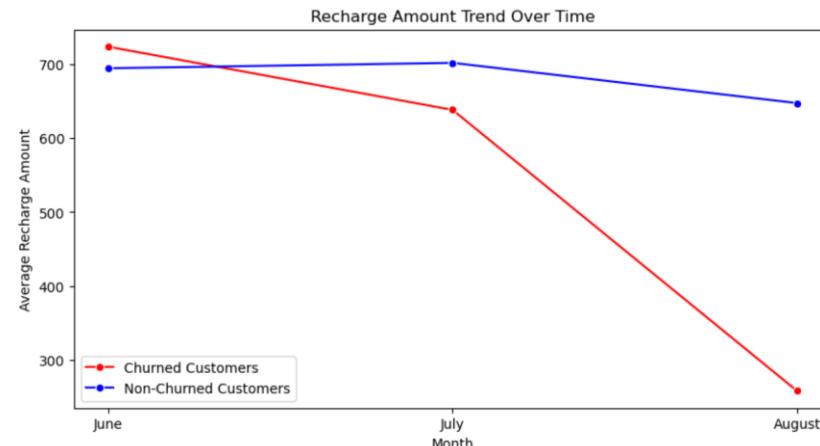
Length: 226, dtype: int64)

# EXPLORATORY DATA ANALYSIS (EDA)

📌 Churn Rate: 8.6% of high-value customers churned.

📌 Behavioural Insights:

- Recharge amounts drop sharply before churn.
- Data & call usage decline over months.
- Customers showing early warning signs are likely to churn.



# FEATURE ENGINEERING

📌 New Features Created:

✓ Recharge Drop %: 📈 Customers reducing recharge amounts by more than **30%**.

✓ Call Usage Drop %: 📞 Decrease in call volume over months.

✓ Data Usage Drop %: 🌐 Significant drop in data consumption.

✓ Early Churn Risk Flag: 💡 Customers showing early disengagement signals.

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207.004219	-30.080162
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-92.647059	-100.000000

data_usage_change_6_8	early_churn_risk
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inf	1
inf	0
0.0	1
0.0	1

# MODEL SELECTION

## 📌 Models Used & Why:

- ✓ **Logistic Regression:** Baseline model, interpretable.
- ✓ **Random Forest:** Handles non-linearity, good for feature importance analysis.
- ✓ **XGBoost:** Best for accuracy, optimized for class imbalance.

## 📌 Class Imbalance Handling:

- ✓ Used **SMOTE** (Synthetic Minority Oversampling) to balance churn vs. non-churned data.

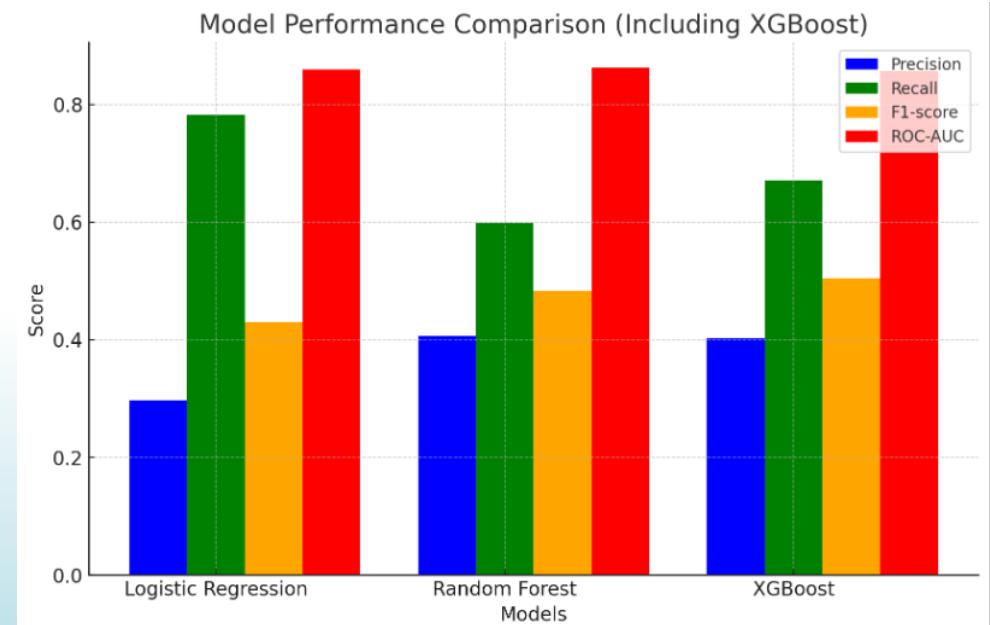
# MODEL PERFORMANCE COMPARISON

## 📌 How Well Did Each Model Perform?

	Model	Precision	Recall	F1-score	ROC-AUC
0	Logistic Regression	0.296784	0.782274	0.430313	0.859743
1	Random Forest	0.405476	0.599229	0.483670	0.862308
2	XGBoost	0.403244	0.670520	0.503618	0.856730

## 📌 Key Takeaways:

- Higher Precision: Fewer false churn predictions.
- Higher Recall: Better detection of actual churners.
- XGBoost likely has the best performance.



# KEY FEATURES INFLUENCING CHURN

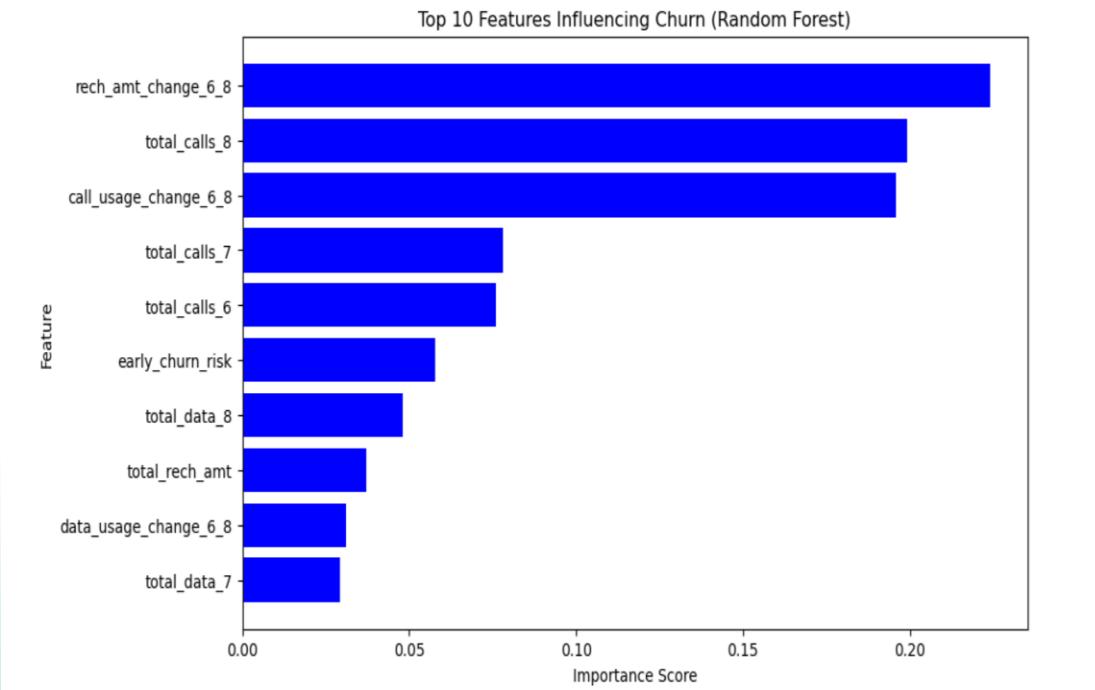
## 📌 Top Features That Predict Churn:

✓ Recharge Drop % (Most important) → 📈 Customers with 50%+ recharge drop are at high risk.

✓ Call Usage Decline → 📞 Lower call volume → Loss of engagement.

✓ Data Usage Drop → 🌐 Lower data consumption signals possible switch to competitor.

✓ Early Churn Risk Flag → 🚨 Strong early churn indicator.



# BUSINESS RECOMMENDATIONS

## 📌 What Should Telecom Companies Do to Reduce Churn?

### ① Target High-Risk Customers

- ⬇️ Offer discounts & customized plans for users showing 30%+ recharge drop.
- 🎁 Reward loyal customers with free data packs.

### ② Early Churn Detection Alerts

- ⚠️ Customers reducing usage should receive automated retention offers.
- 📞 Send personalized messages offering better plans.

### ③ Network & Plan Improvements

- 📡 Improve service quality in areas with dropping call usage.
- ⚖️ Offer competitive pricing to match competitors' plans.

# CONCLUSION & NEXT STEPS

## 📌 Project Summary:

- Used ML models to predict customer churn.
- Identified key churn indicators (recharge & usage drops).
- Suggested data-driven retention strategies.

## 📌 Next Steps:

- Deploy Model for Real-Time Churn Prediction.
- Integrate Retention Alerts for At-Risk Customers.
- Optimize Plans & Network Coverage.

"Thank You!" 💫