

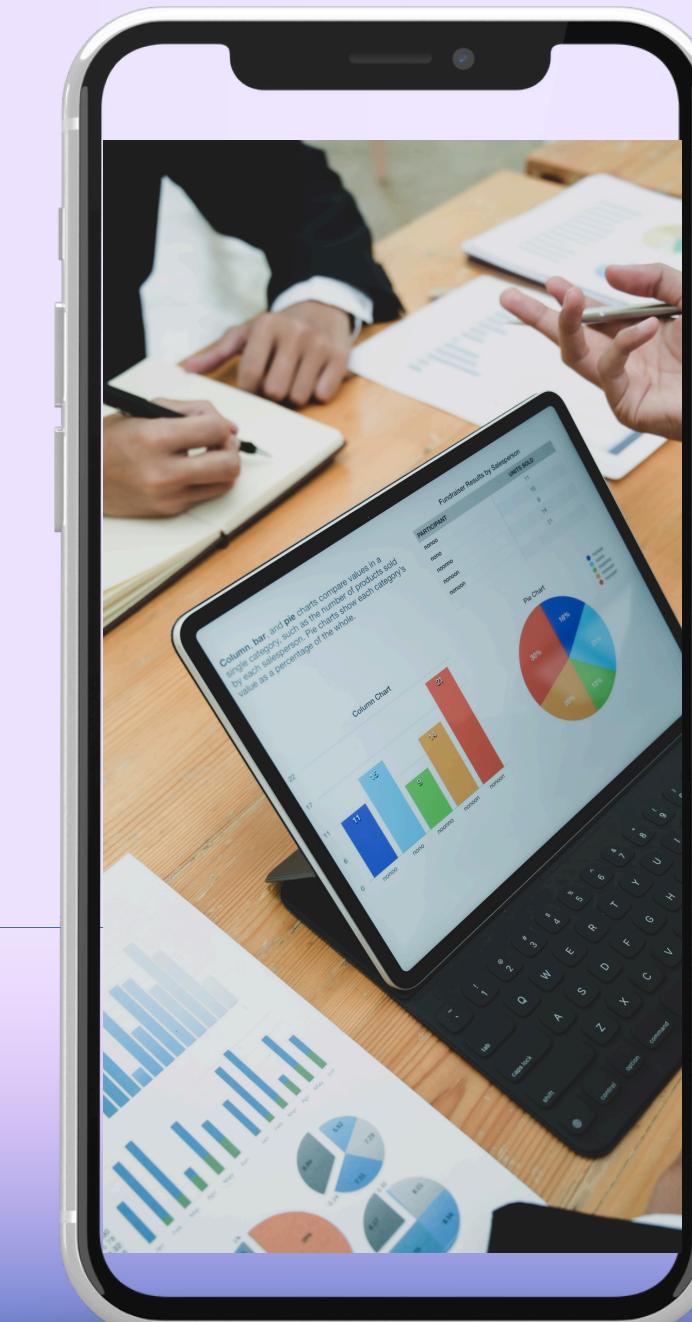
# Customer Churn Analysis

Identifying key churn drivers and predicting high-risk customers



# Business Problem

Customer churn is a key challenge for telecom companies, leading to significant revenue loss. With growing competition, retaining existing customers is more cost-effective than acquiring new ones. Many churns can be prevented by analyzing customer behavior, service usage, and contract patterns. This project aims to identify churn drivers and predict high-risk customers using data-driven insights.



# Project Objective



- Analyze customer records to uncover churn patterns.
- Visualize churn insights using interactive Power BI dashboards.
- Build a machine learning model to predict high-risk churn customers.
- Provide actionable insights for customer retention strategies.

# Dataset Overview



- Total Records: 6,418
- Columns: Customer ID, Gender, Age, Tenure, Internet Type, Contract, Charges, etc.
- Target Variable: Customer\_Status (Stayed, Churned, Joined)
- Source: Provided CSV file (imported into MySQL)



# Technologies Used

- MySQL – Data cleaning, transformation, SQL insights
- Power BI – Dashboards, DAX KPIs, Tooltips, Bookmarks
- Python – ML modeling with scikit-learn
- Libraries: Pandas, NumPy, Matplotlib, Seaborn, Joblib

# ETL & Data Preprocessing



- Built ETL pipeline in MySQL Workbench to clean and transform data
- Handled nulls using conditional logic and imputations
- Removed duplicates and corrected data types
- Created tenure buckets and cleaned categorical fields for modeling

# SQL Based Insights



- Churn rate by contract type, tenure, and internet service
- Revenue loss due to churned customers
- Churn trend by tenure buckets
- % of churned users with unlimited data or paperless billing
- Identified high-risk customer segments using SQL filtering

# CHURN ANALYSIS - SUMMARY

Monthly Charge Status

All

Married

All

Churn Prediction

**6418**

Total Customers

**411**

New Joiners

**27.0%**

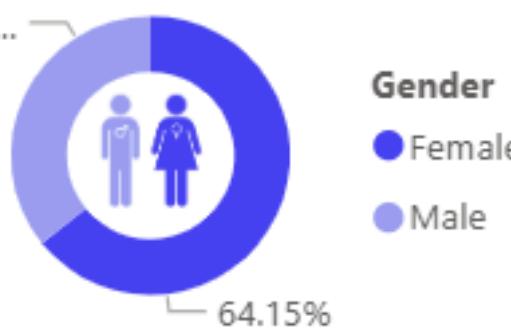
Churn Rate

**1732**

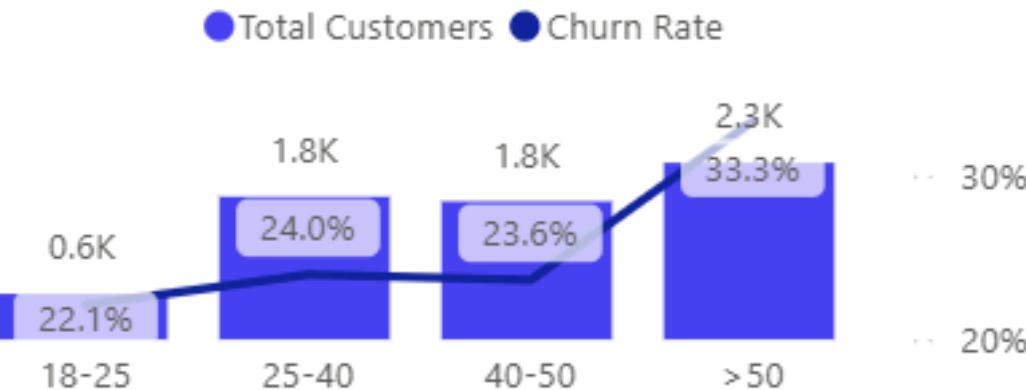
Total Churn



Total Churn by Gender

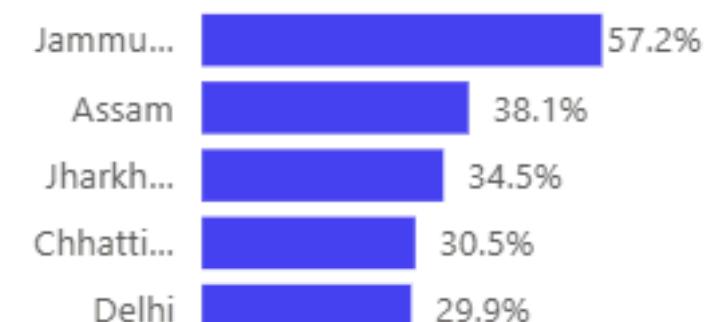


Total Customers and Churn Rate by Age Group



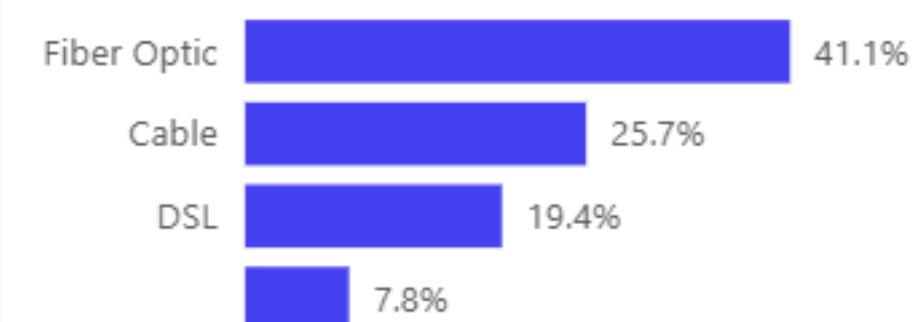
GEOGRAPHIC

Top 5 State by Churn Rate

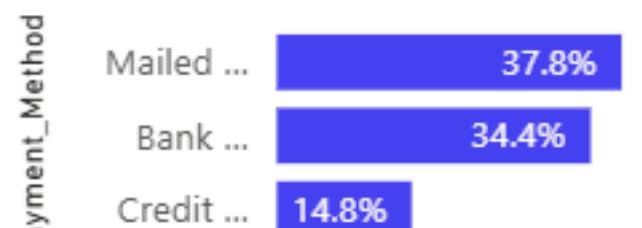


SERVICES USED

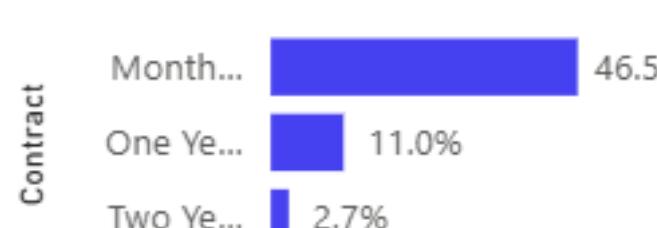
Churn Rate by Internet\_Type



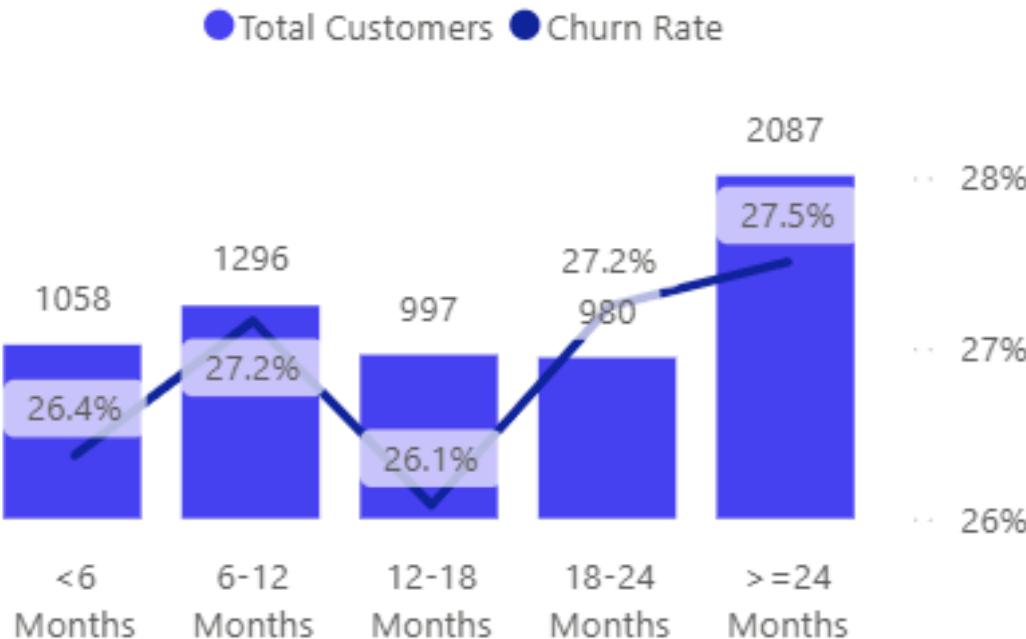
Churn Rate by Payment\_Method



Churn Rate by Contract

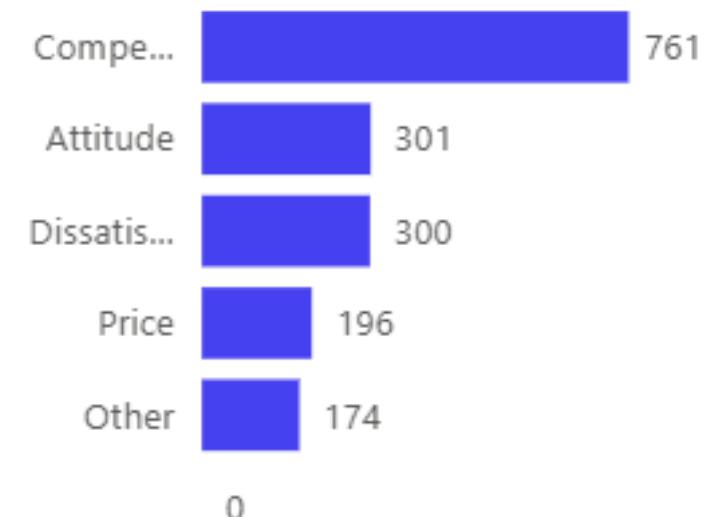


Total Customers and Churn Rate by Tenure Group



CHURN DISTRIBUTION

Total Churn by Churn\_Category



Churn by Services

Services	No	Yes
Device_Protection_Plan	69.1%	30.9%
Internet_Service	6.3%	93.7%
Multiple_Lines	50.1%	49.9%
Online_Backup	70.0%	30.0%
Online_Security	83.6%	16.4%
Paperless_Billing	25.4%	74.6%
Phone_Service	9.4%	90.6%
Premium_Support	82.4%	17.6%
Streaming_Movies	53.0%	47.0%

# Machine Learning Model



- Used Random Forest Classifier to predict churn
- Accuracy: 84%
- Performed Label Encoding, Train-Test split, and Feature Importance analysis
- Saved model using joblib and used outputs in Power BI

# CHURN ANALYSIS - PREDICTION

Summary

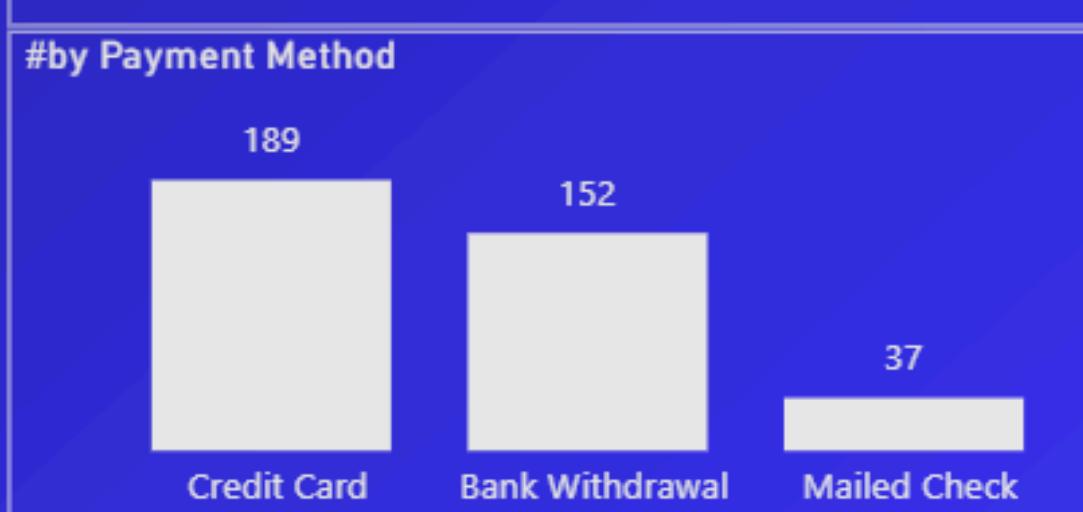
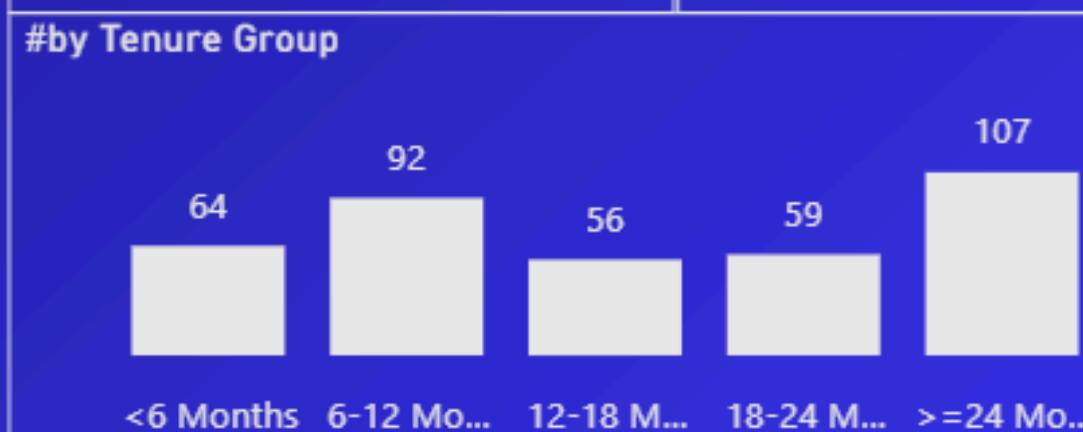
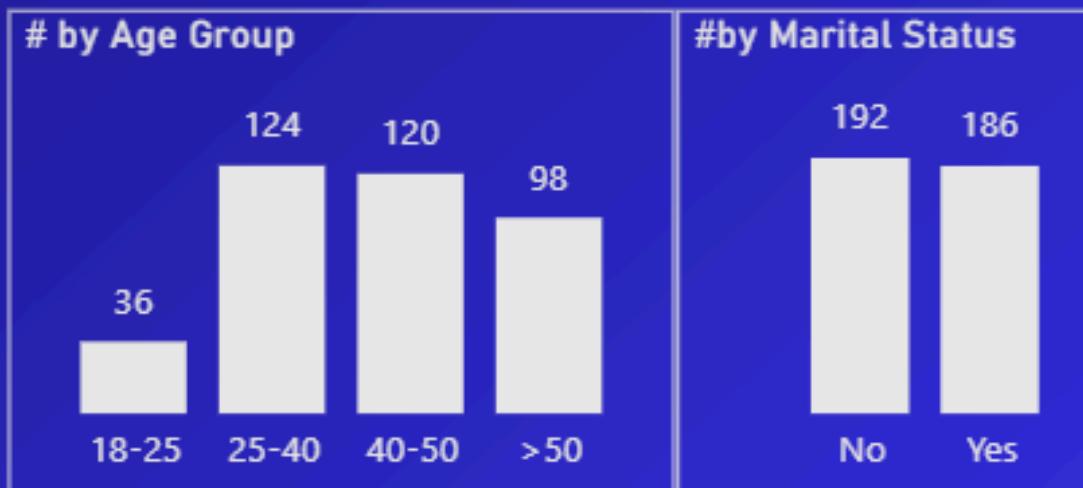
## PREDICTED CHURNER PROFILE

246      132

Female



Male



## #by States

Uttar Prad...	44
Maharash...	39
Tamil Nadu	37
Karnataka	31
Bihar	25
Andhra Pr...	23
Haryana	23
Telangana	20
West Ben...	20
Gujarat	18
Madhya P...	16
Punjab	16
Rajasthan	12
Assam	10
Odisha	9
Jharkhand	8
Delhi	7

## #by Contract

Month-to...	352
One Year	15
Two Year	11

## CUSTOMERS AT RISK

Total Number of Predicted Churners: 378

Customer_ID	Monthly_Charge	Total_Revenue	Total_Refunds	Total_Referrals
79700-KER	107.95	456.10	0.00	5
84789-PUN	107.95	356.58	0.00	9
13123-BIH	100.20	253.62	0.00	13
23632-HAR	97.10	262.85	0.00	2
26902-TEL	95.85	98.55	0.00	7
25733-HAR	95.50	257.85	0.00	8
13666-UTT	95.40	344.18	0.00	15
76419-KAR	94.90	282.11	0.00	14
97828-MAH	92.00	313.60	0.00	0
25517-RAJ	91.45	280.27	0.00	4
92494-MAH	91.15	272.06	0.00	11
34713-KER	90.75	229.09	0.00	1
83994-DEL	90.70	253.82	0.00	8
12056-WES	90.40	362.89	0.00	2
94070-JAM	90.10	114.43	0.00	8
19811-MAH	89.85	348.30	0.00	10
78220-TAM	89.85	319.75	0.00	14
96967-CHH	89.35	94.71	0.00	5
37131-MAH	89.25	105.89	0.00	6
78918-BIH	86.05	299.63	0.00	12

# Project Outcomes



- Identified top churn drivers: Contract Type, Tenure, Monthly Charges
- Built dual Power BI dashboards with actionable insights
- Delivered 84% accurate churn prediction model
- Enabled strategic targeting of high-risk customers for retention

# Thank You.



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