



Telco Customer Churn Analysis

Analyzing customer churn patterns in a telecom dataset to identify key factors driving customer attrition using SQL, Power BI, and Python.

Data Summary

7043

Total Observations

21

Parameters Analyzed

The dataset encompasses comprehensive customer information including demographics, account relationships, service subscriptions, value-added services, contract details, billing behavior, and revenue metrics.

Key Features: Customer Demographics, Tenure, Service Subscriptions, Contract Types, Payment Methods, Monthly & Total Charges.

Data Preparation & Analysis

01

Import Dataset

Imported dataset into Jupyter Notebook using pandas library for analysis.

02

Verify Data Quality

Confirmed no null values or duplicate entries using `df.isna().sum()` and `df.duplicated().sum()`.

03

Preprocessing

Removed identifiers to reduce noise and encoded categorical data using LabelEncoder.

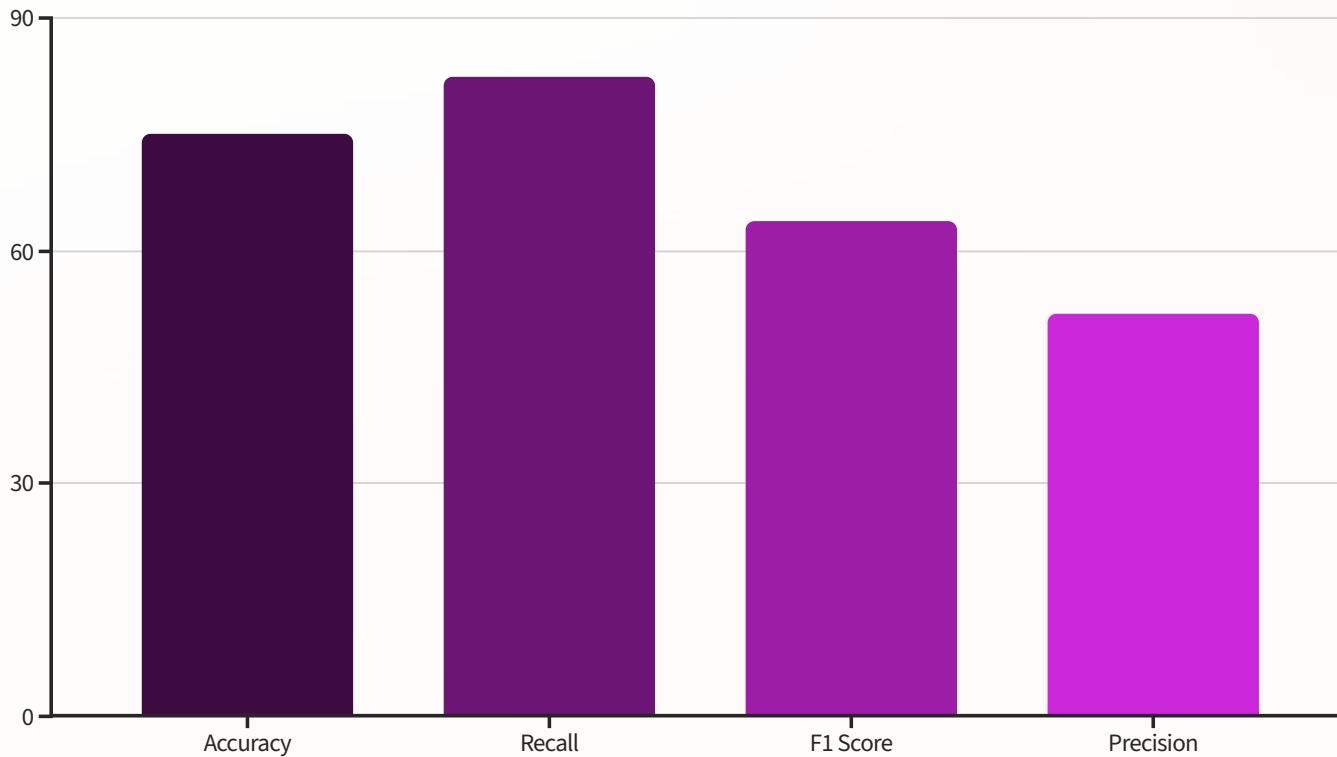
04

Exploratory Analysis

Analyzed correlations, distributions, and outliers using heatmaps, subplots, and boxplots.



Logistic Regression Results



The LogisticRegression model achieved 75.16% accuracy with strong recall (82.31%), indicating effective identification of at-risk customers. The threshold was tuned to 0.4 for business-focused predictions.

High recall ensures we capture most churning customers, critical for proactive retention efforts.

Top Features Impacting Churn

Monthly Charges

0.807 coefficient

Strongest predictor of churn

Internet Service

0.172 coefficient

Service type influences retention

Paperless Billing

0.163 coefficient

Billing method affects churn

Total Charges

0.094 coefficient

Cumulative spending impact

Payment Method

0.069 coefficient

Payment type correlation

Customer Churn Overview

26.54%

Churn Rate

1,869 of 7,043 customers

73.46%

Retention Rate

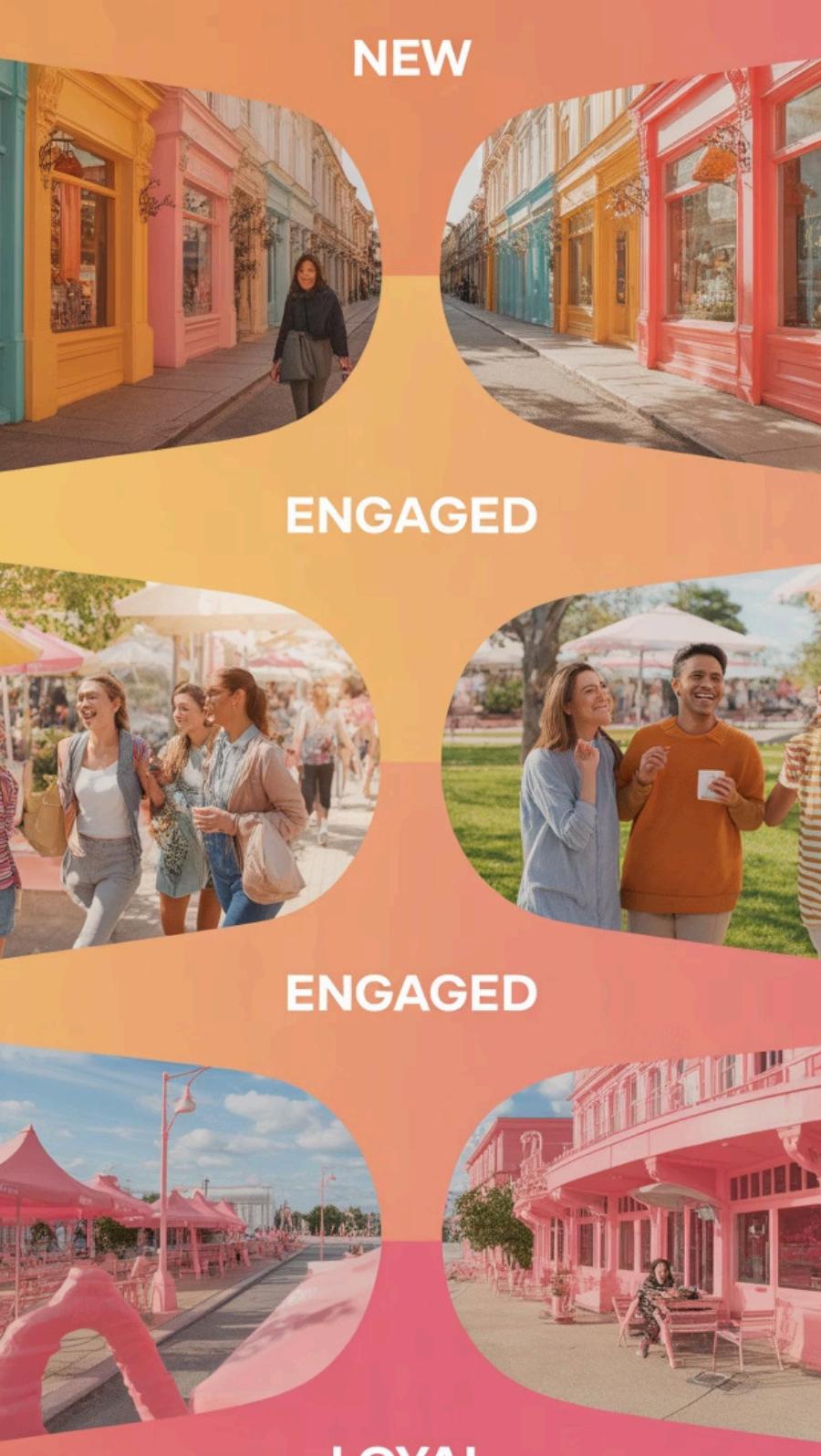
5,174 customers retained

Gender Distribution

Churn is balanced across gender: females represent 50.24% of churned customers, males 49.76%.

Senior Citizens

Senior citizens show higher churn risk at 41.68% compared to 23.61% for non-seniors, despite representing only 25.47% of total churn.



NEW

Customer Segmentation Insights

ENGAGED

ENGAGED

LOYAL

1

New Customers (0-12 months)

55.48% of total churn

1,037 churned customers - highest risk group requiring immediate attention.

2

Established Customers (13-48 months)

33.12% of total churn

619 churned customers - moderate risk requiring engagement strategies.

3

Loyal Customers (48+ months)

11.40% of total churn

213 churned customers - lowest risk, highest value retention target.

⚠ CRITICAL FINDINGS

High-Risk Churn Factors



Electronic Check Payments

45.29% churn rate - highest among all payment methods, indicating significant risk.



Fiber Optic Service

69.40% of churned customers used fiber optic, with 41.89% churn rate.



Month-to-Month Contracts

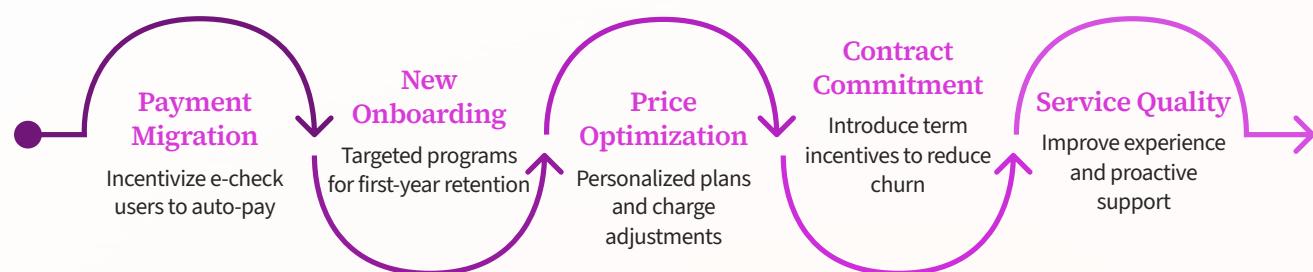
88.55% of churn from monthly contracts with 42.71% churn rate.



Paperless Billing

74.91% of churned customers used paperless billing with 33.57% churn rate.

Key Insights & Recommendations



Payment Method

Incentivize electronic-check users to switch to auto-payment with discounts.

New Customers

Implement targeted onboarding programs for first-year retention.

Monthly Charges

Offer personalized plans for customers paying \$75-100 monthly.

Contract Type

Promote long-term contracts with bundled services and reduced pricing.

Fiber Optic

Improve service reliability and provide proactive support for premium users.

Interactive Dashboard Delivered

Created comprehensive Power BI dashboard enabling visual exploration of churn patterns across payment methods, customer segments, contract types, and service offerings.



Data-Driven Insights

SQL analysis identified 26.54% churn rate with clear patterns across demographics and services.



Predictive Modeling

Logistic regression achieved 75.16% accuracy with optimized threshold for business focus.



Actionable Recommendations

Five strategic initiatives targeting high-risk segments to reduce customer attrition.

