

Customer Churn in Telecom Subscription-based Businesses

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MOTIVATION

- **Project Focus:** Analyze customer churn rates and CLTV to improve management of subscription-based businesses.
- **Goal of Churn Prediction:** Identify at-risk clients and develop targeted retention strategies.
- **Integration of CLTV Analysis:**
 - Enhance profitability through strategic business decisions.
 - Gain deeper insights into customer behaviors.
- **Product and Service Refinement:** Emphasize the refinement of offerings to reduce churn rates.



2

RESEARCH OBJECTIVES



TWO OBJECTIVES

Churn Reduction and Retention Strategy Development

Identify the main reasons for customer churn and reduce churn by identifying potential switchers. The churn rate directly impacts revenue and profits.

Understanding the factors influencing it will help develop strategies to reduce customer churn and retain valuable customers.



Enhancing Customer Acquisition and Retention through Behavioral Insights

Develop new products and efficient marketing campaigns by understanding customer behavior trends. This understanding will not only improve the experience of existing customers but also attract potential customers, thereby benefiting telecom subscription-based businesses.



3

EXPLORATORY DATA



7043

observations

33

variables

Multiple data types

Categorical, Numerical, Geographic, Identifier, Metric

DATA GAPS



Limited Scope of Variables

This dataset doesn't include enough potential variables, such as promotions, employment status, income level, and service modification, as expected. These indicators relevant to the study can limit the depth of analysis and be an obstacle to evaluating how building a promotional strategy affects customer retention or switching.



Geographical limitations

Limited data on locations, specifically solely in California, USA, might skew understanding of infrastructure challenges or successes in different terrains or urbanization levels because the state's geography varied from coastal areas to mountainous regions.

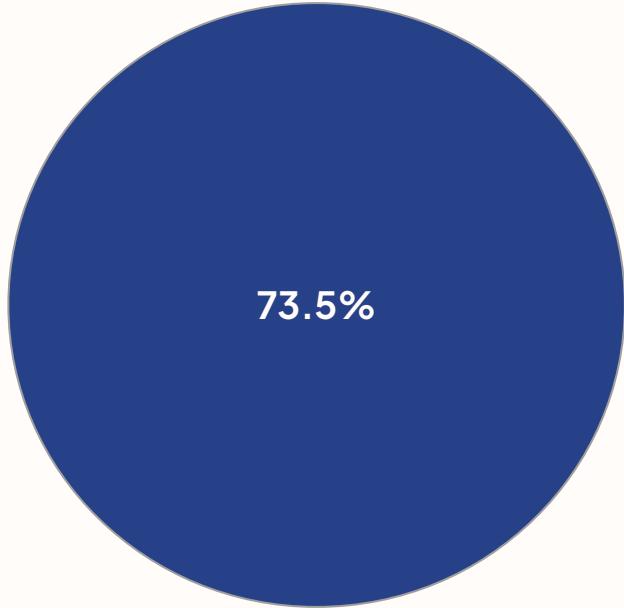


Incompleteness in Analysis

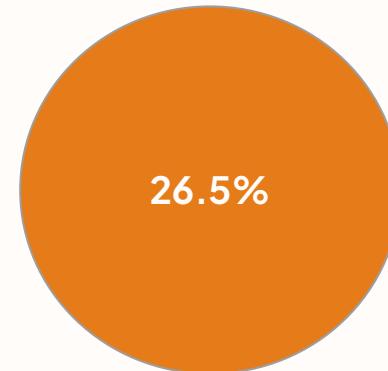
The absence of a CLTV calculation method can hinder deep analytical insights that are crucial for strategic decision-making. CLTV helps us understand customer profitability, guide marketing spending, and optimize customer relationship management strategies.

Churn Value-Target

non-churning customers

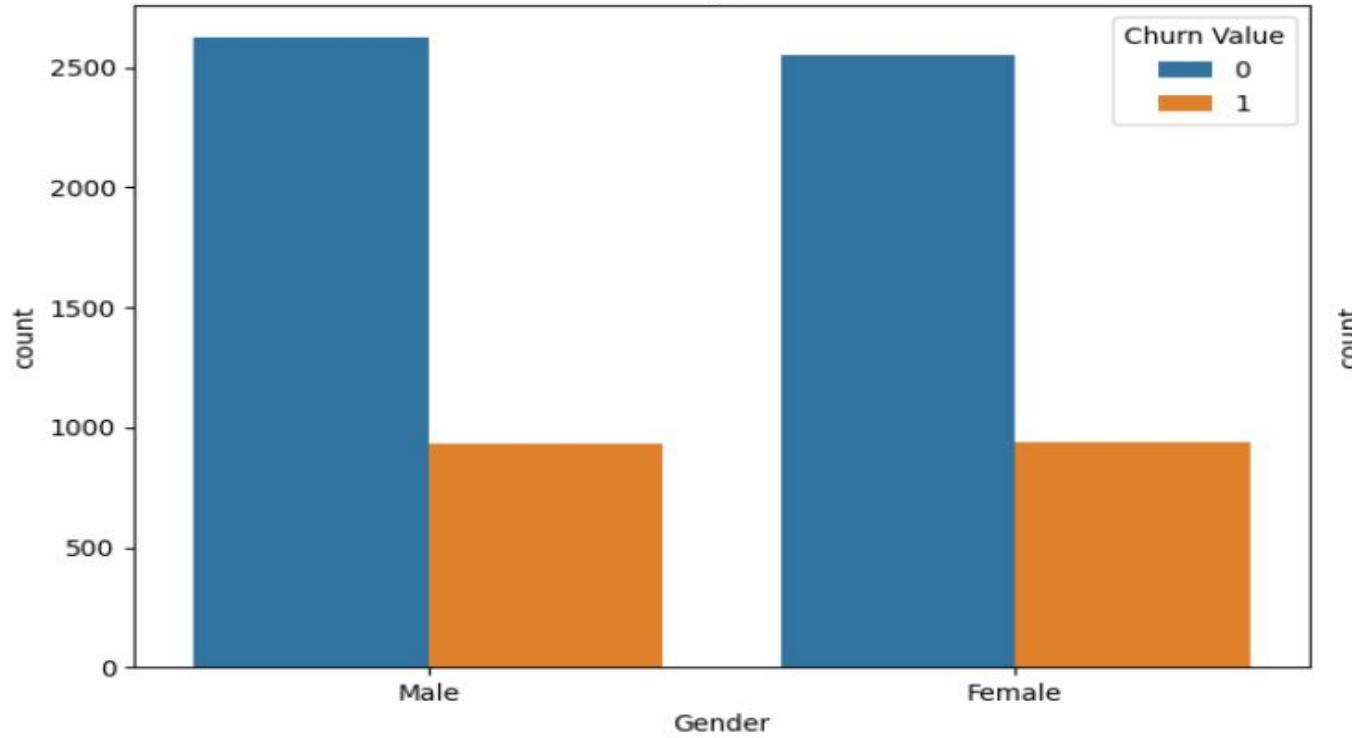


churning customers



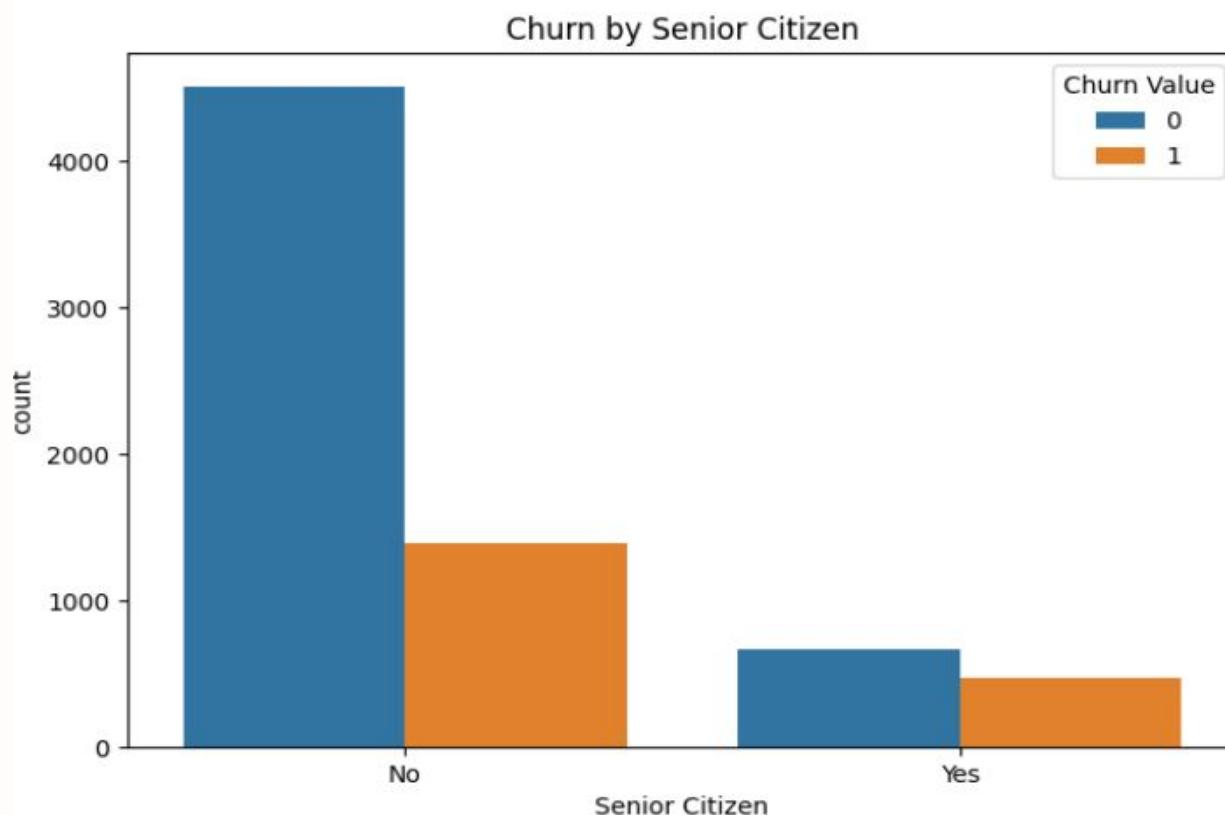
Gender

Churn by Gender



Male 50.5%
Female 49.5%

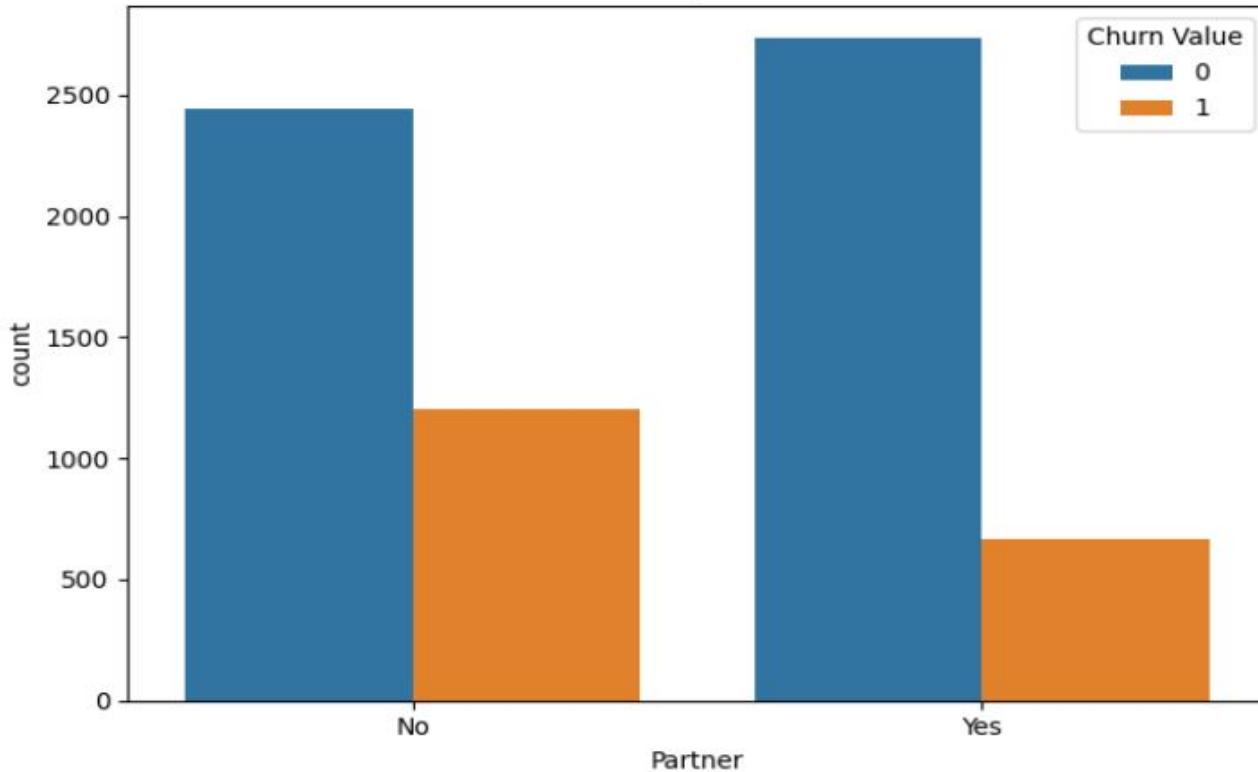
Senior Citizen



No 83.8%
Yes 16.2%

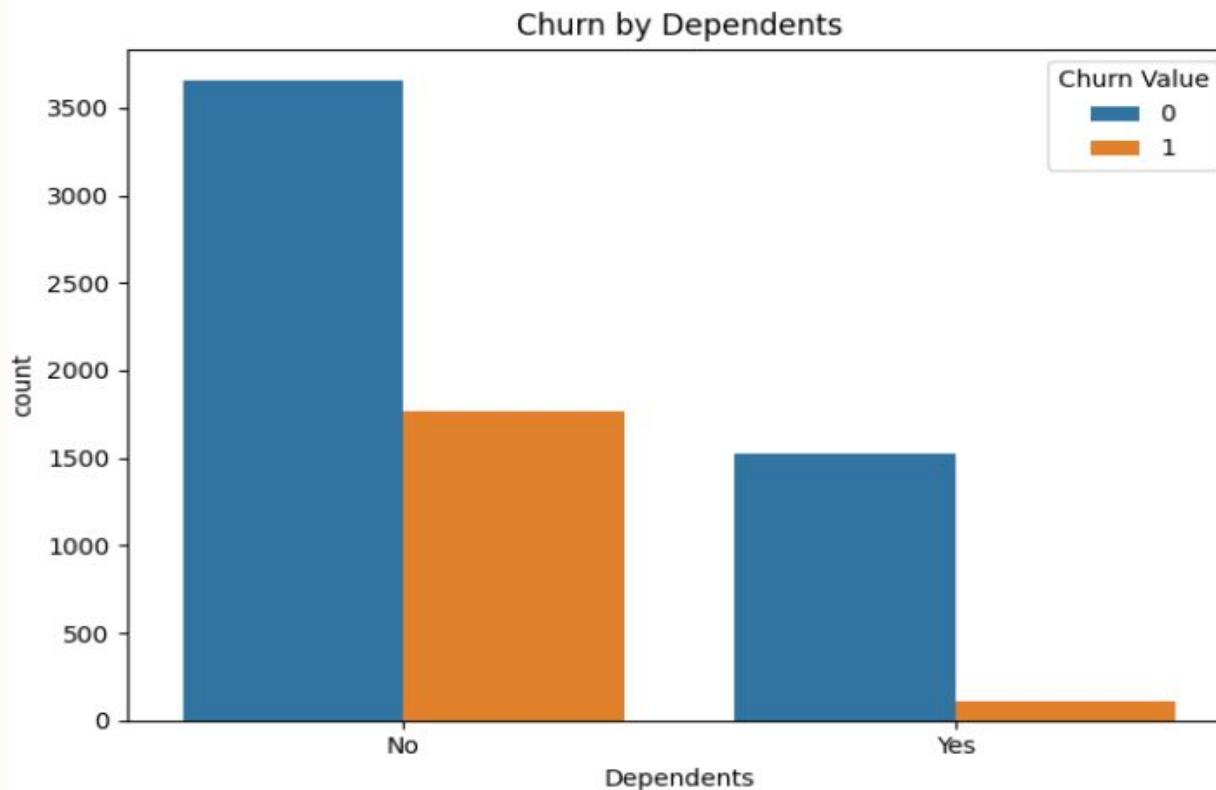
Partner

Churn by Partner



No 51.7%
Yes 48.3%

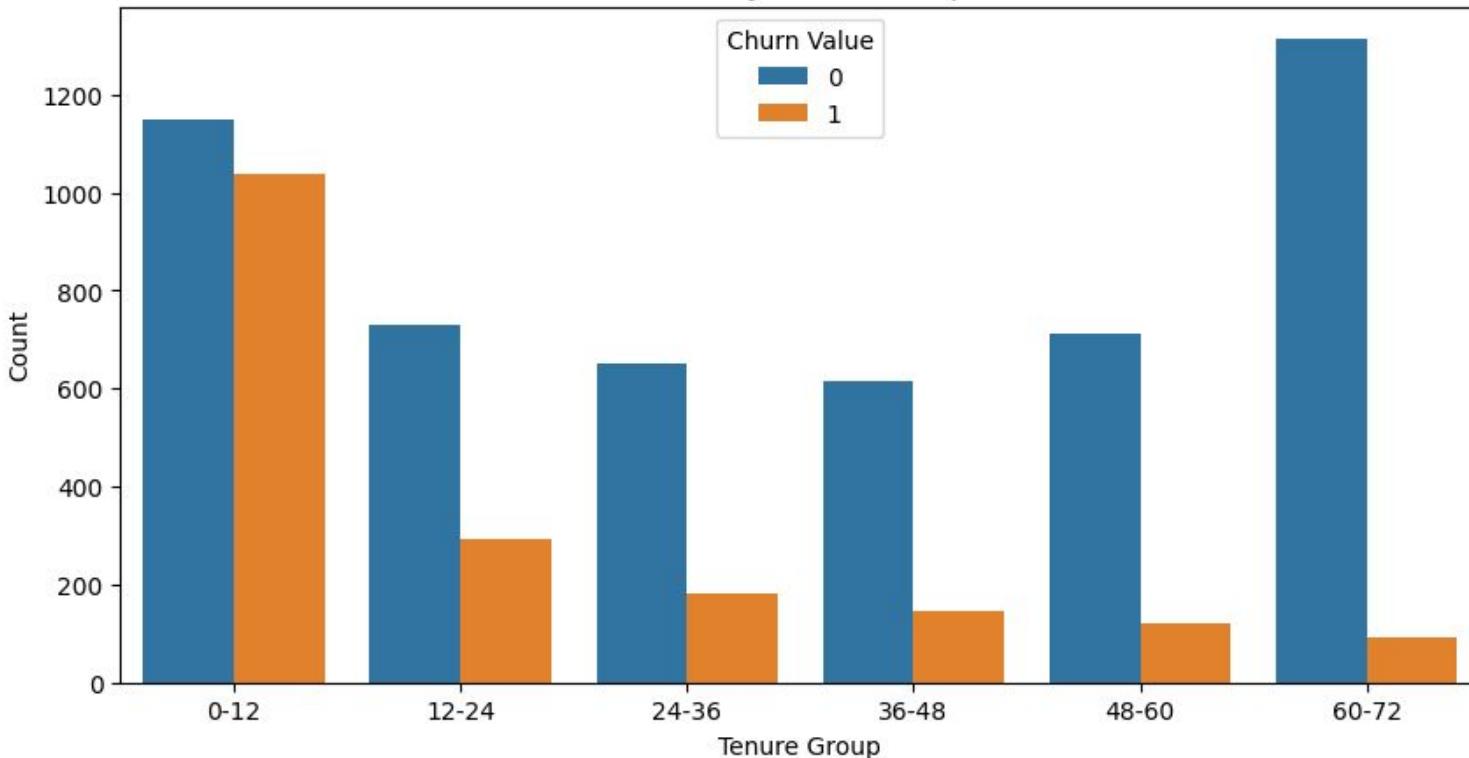
Dependents



No 76.9%
Yes 23.1%

Tenure Group

Churn by Tenure Group



0-12 30.9%

12-24 14.6%

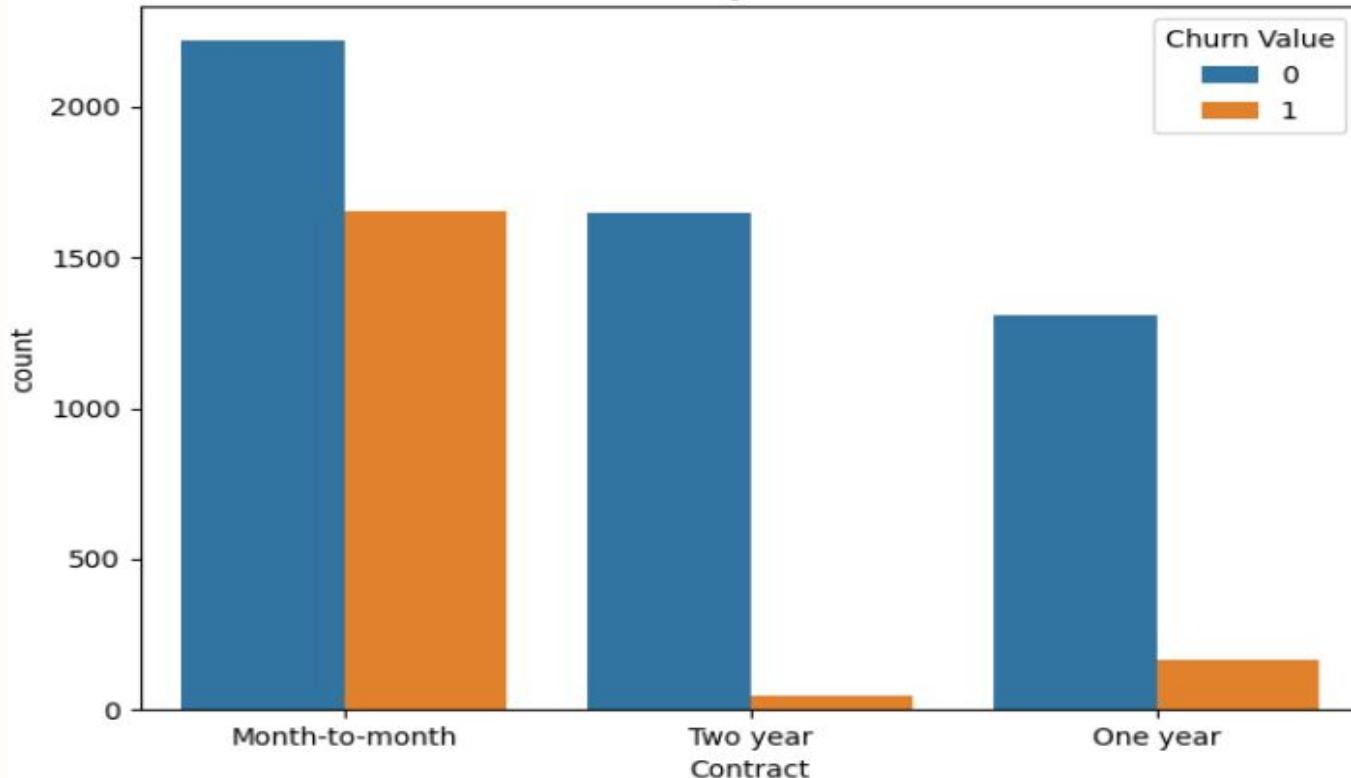
24-48 22.7%

48-60 11.8%

60-72 20.0%

Contract

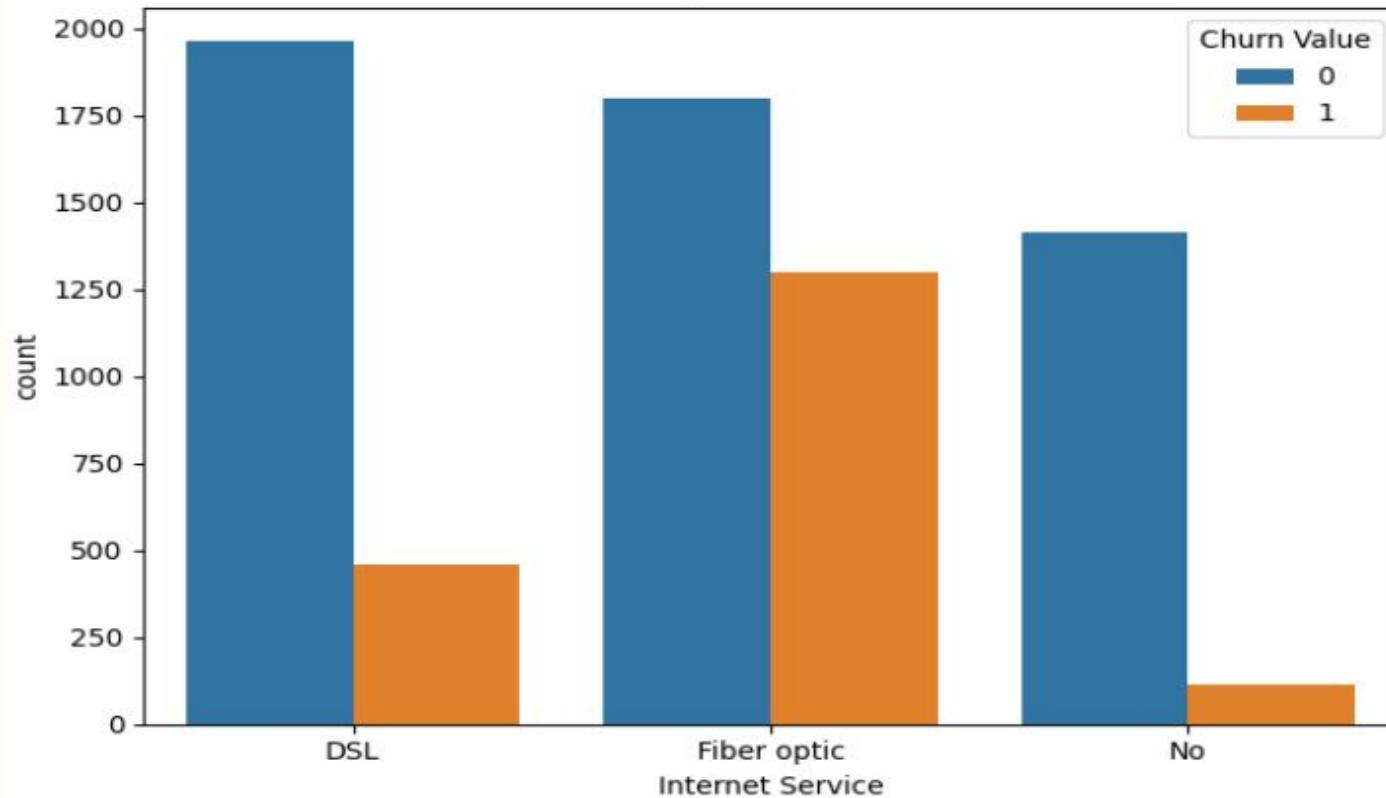
Churn by Contract



Month-to-month	55.0%
Two year	24.1%
One year	20.9%

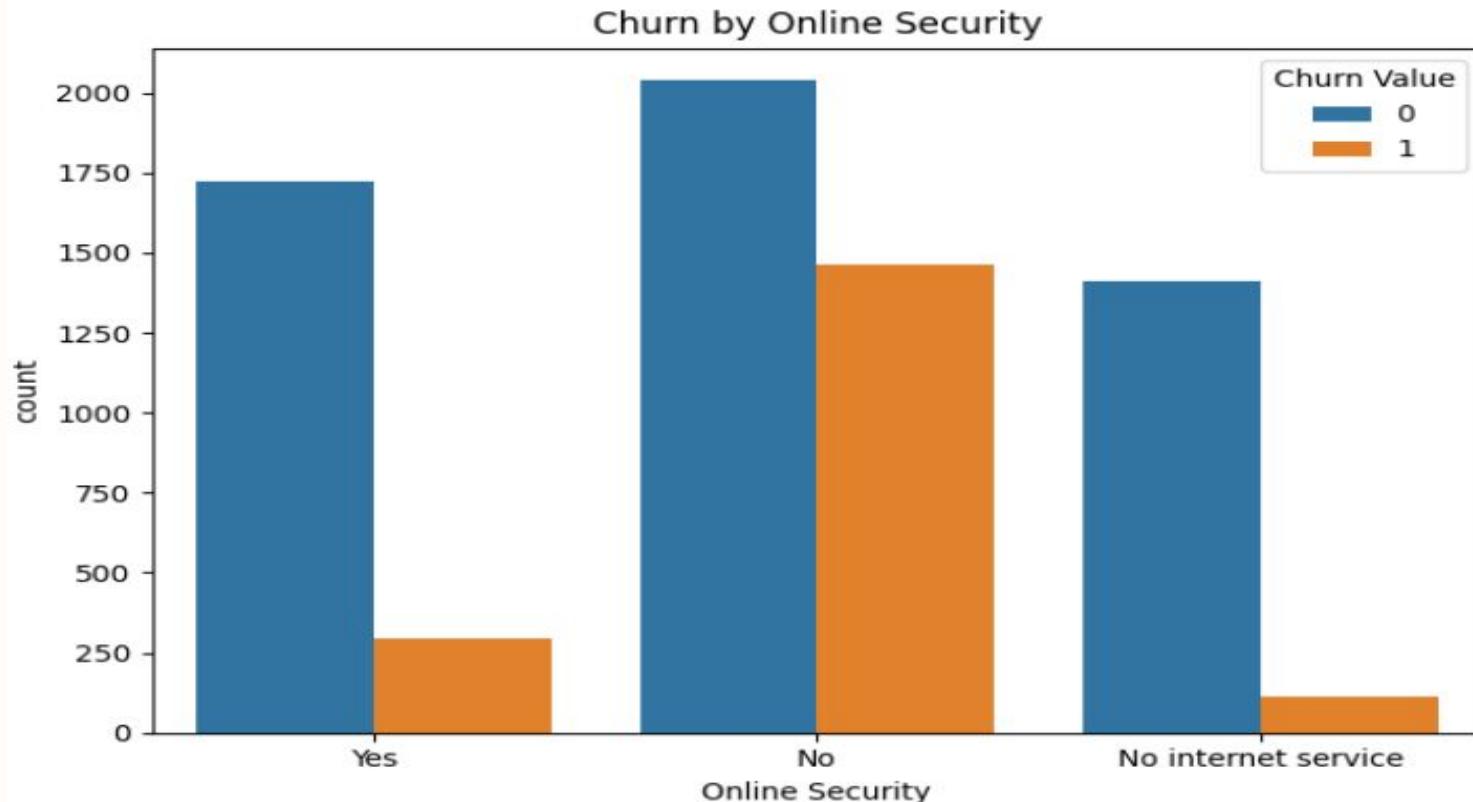
Internet service

Churn by Internet Service



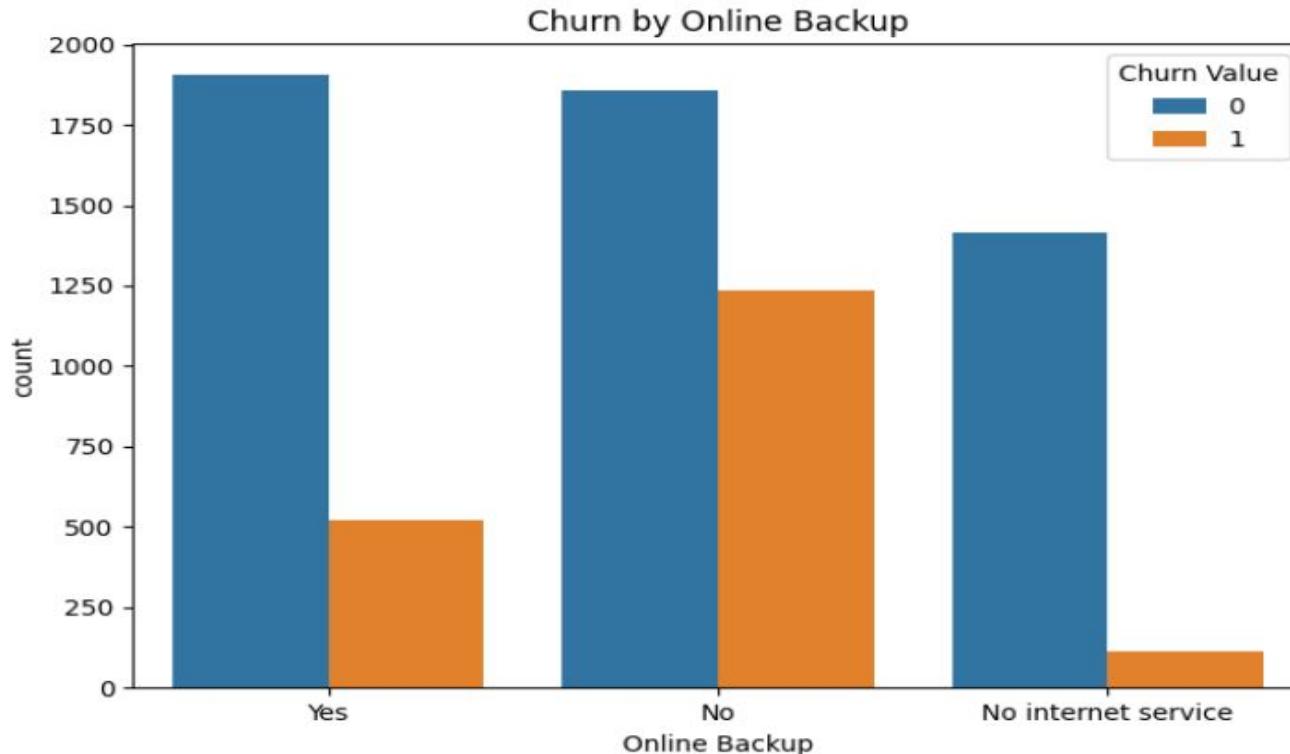
Fiber optic	44.0%
DSL	34.4%
No	21.7%

Online security



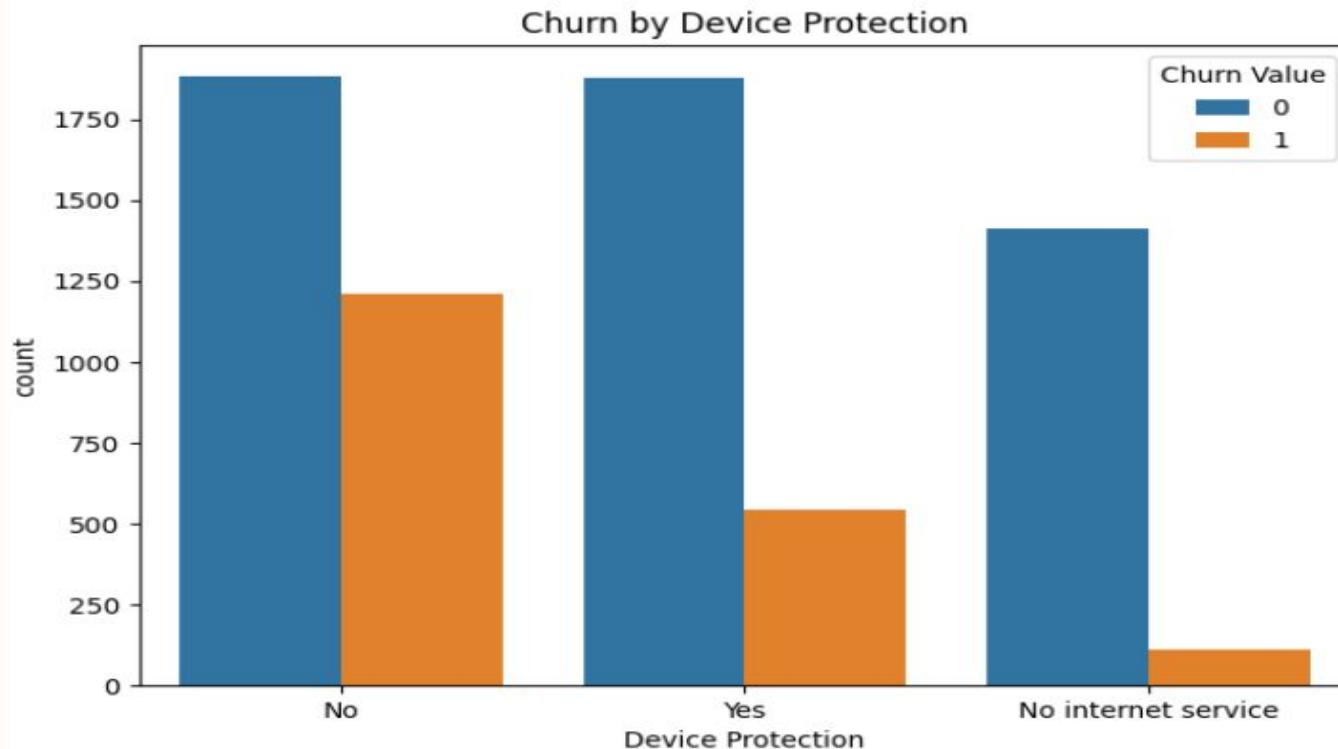
No	49.7%
Yes	28.7%
No internet service	21.7%

Online Backup



No	43.8%
Yes	34.5%
No internet service	21.7%

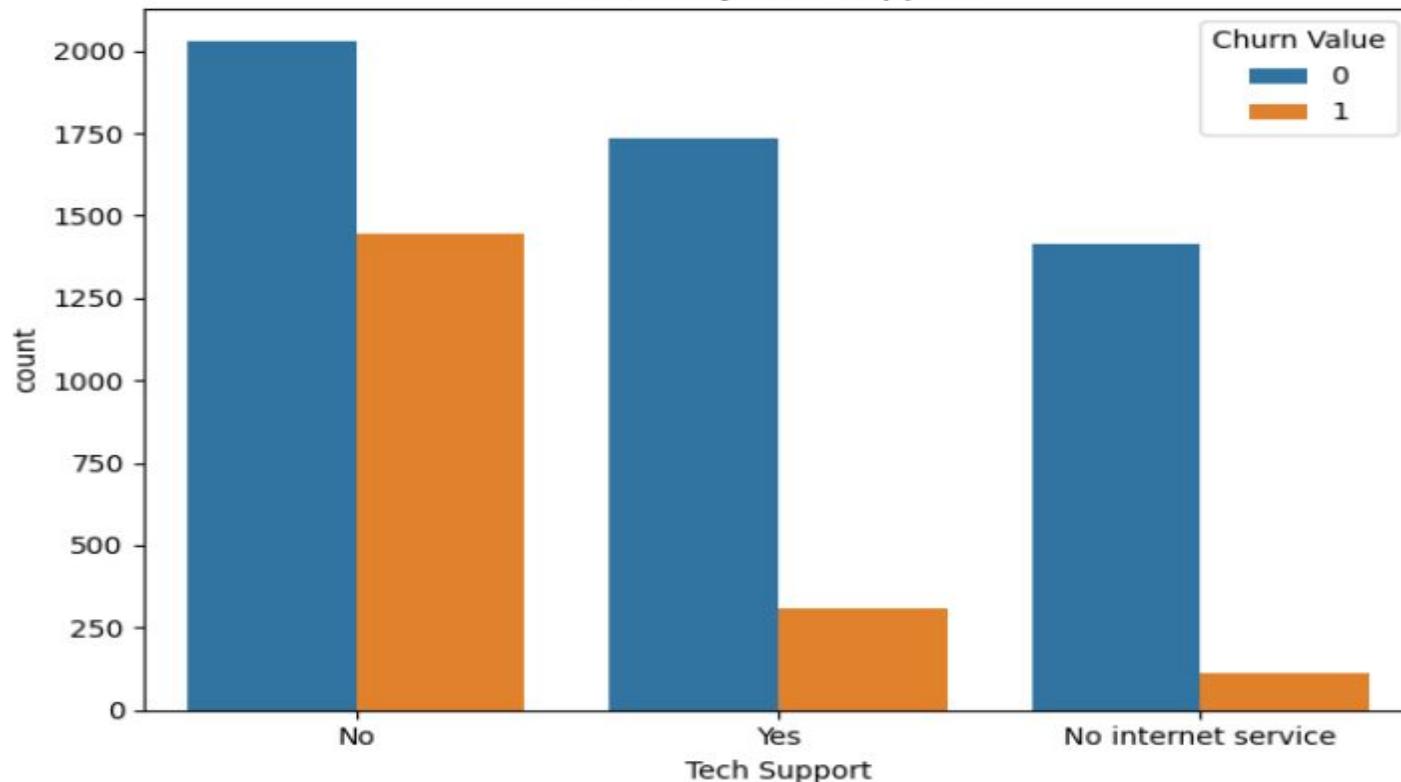
Device Protection



No	43.9%
Yes	34.4%
No internet service	21.7%

Tech Support

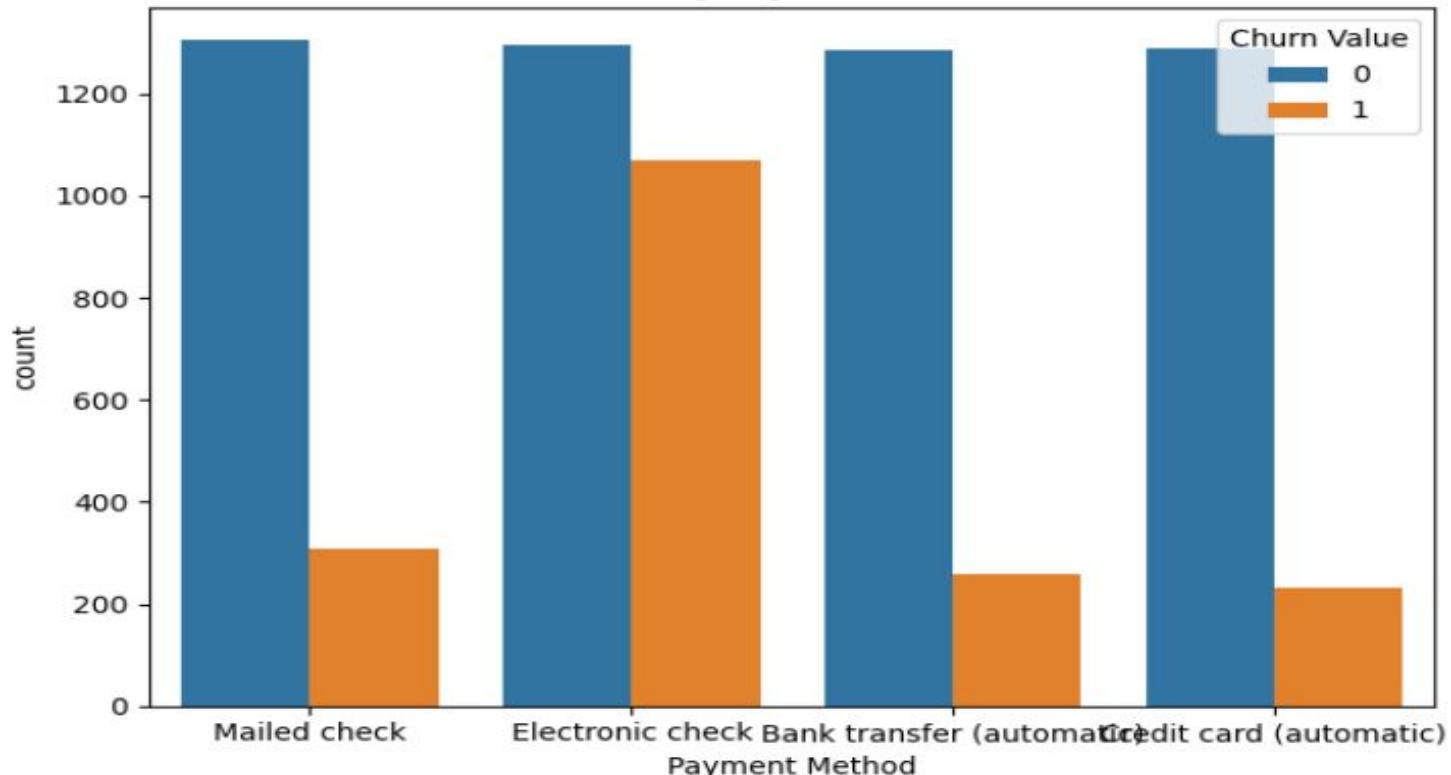
Churn by Tech Support



No	49.3%
Yes	29.0%
No internet service	21.7%

Payment Method

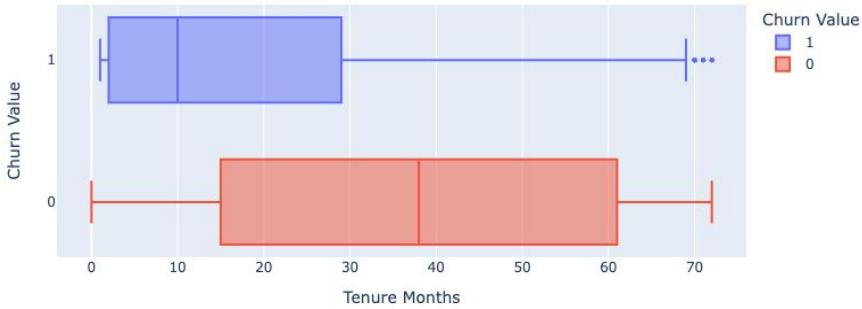
Churn by Payment Method



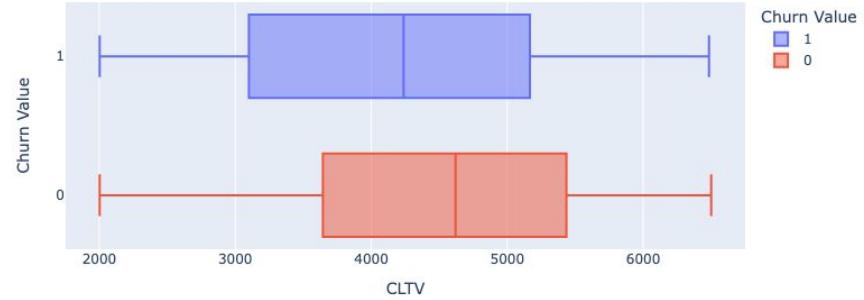
Electronic check	33.6%
Mailed check	22.9%
Bank transfer (automatic)	21.9%
Credit card (automatic)	21.6%

Churn Value - CLTV and Tenure Months

Churn Customers - Tenure Months

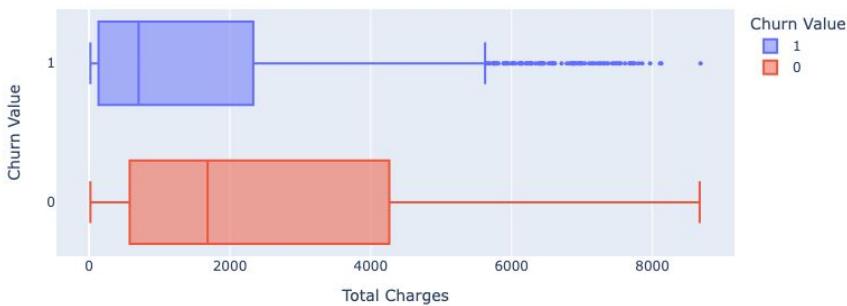


Churn Customers - CLTV

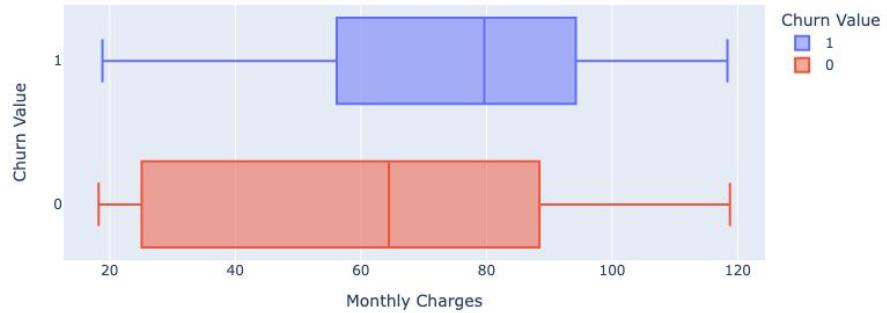


Churn Value - Total Charges and Monthly Charges

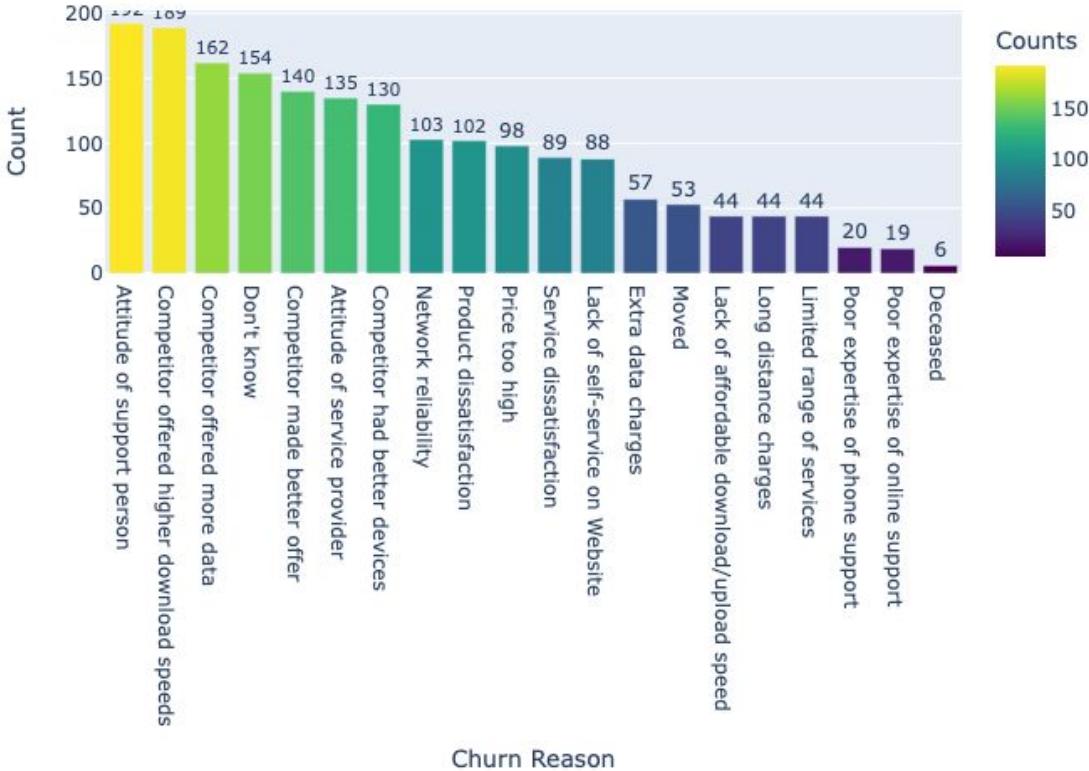
Churn Customers - Total Charges



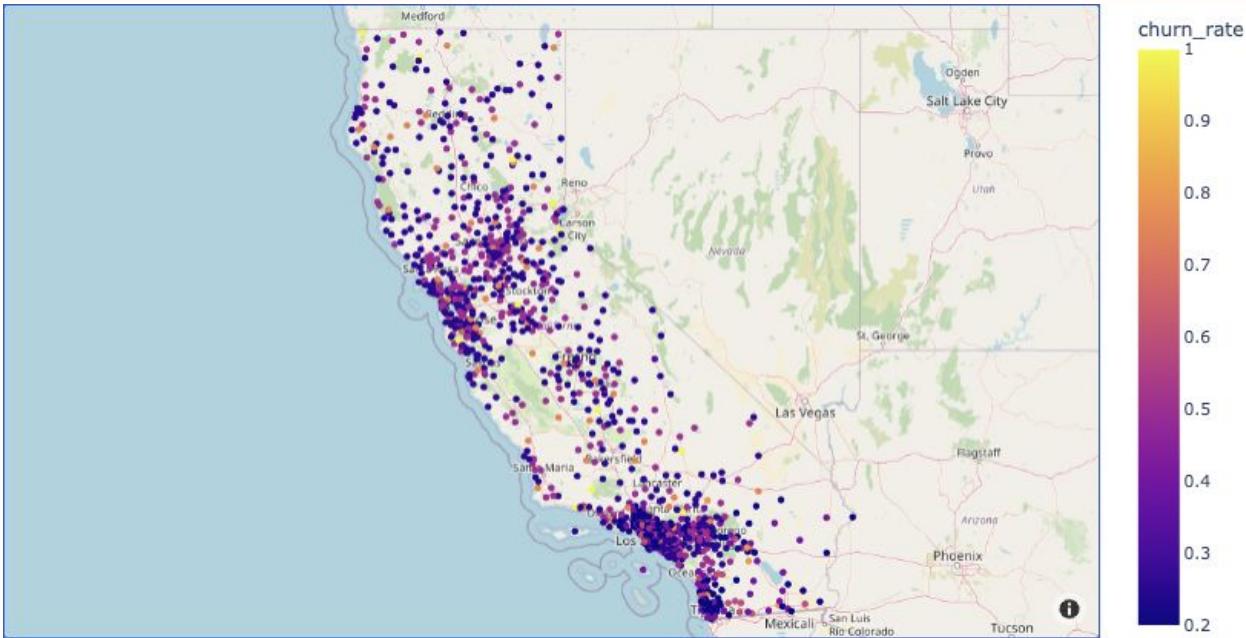
Churn Customers - Monthly Charges



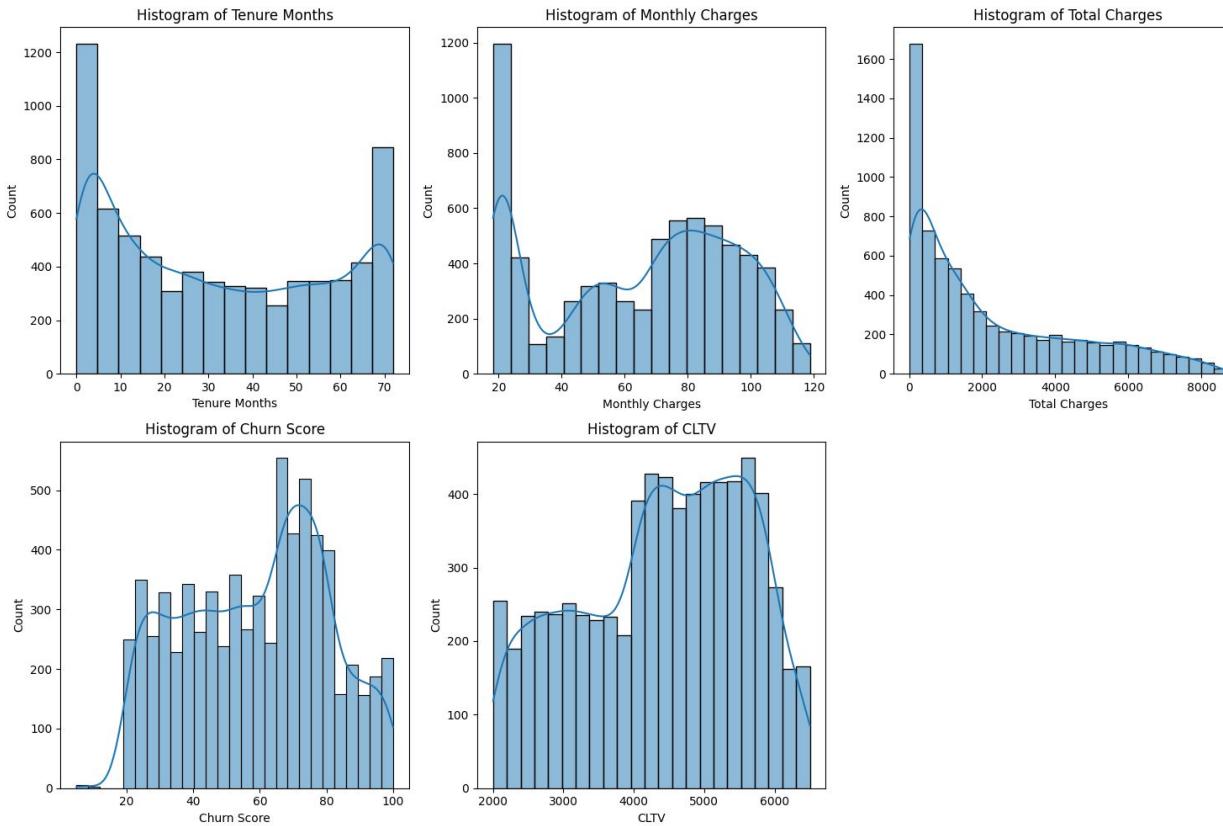
Churn Reason



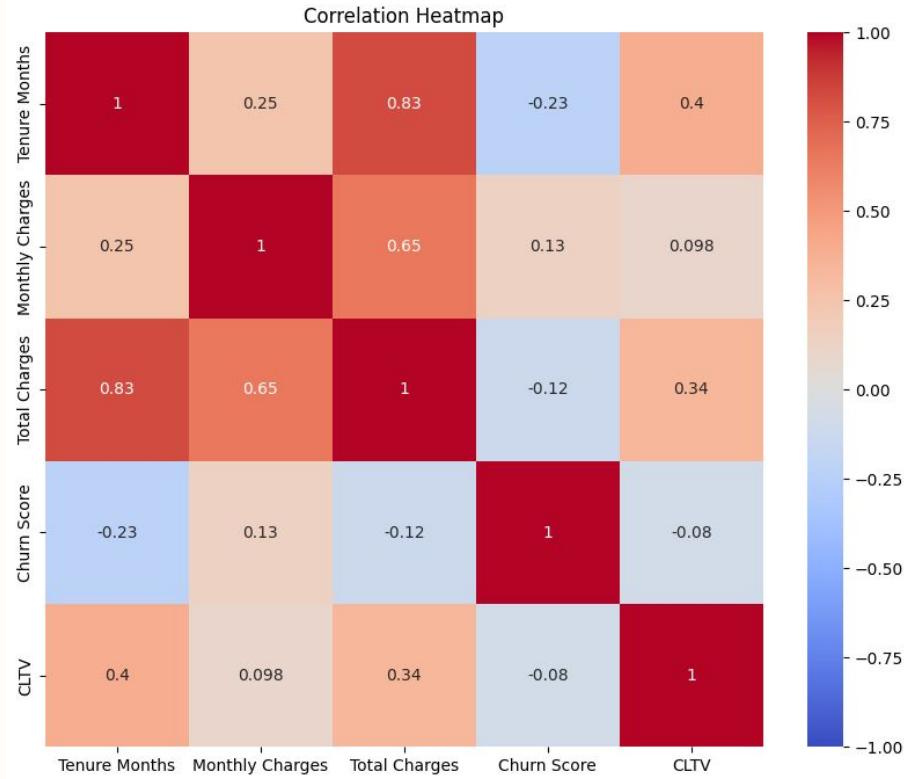
Location



Data Visualization (cont.)



Heatmap



4

DATA MODELING

MODELS



Logistic Regression

After SMOTE



SVM

- Linear Kernel
- Polynomial Kernel
- RBF Kernel



Random Forest

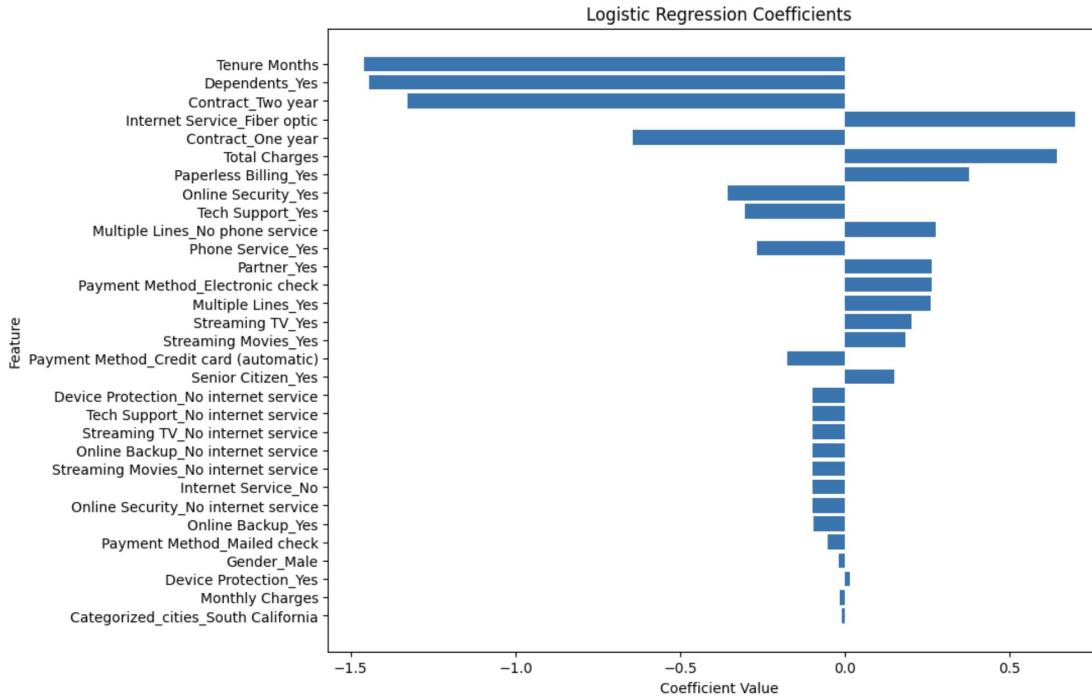
After SMOTE



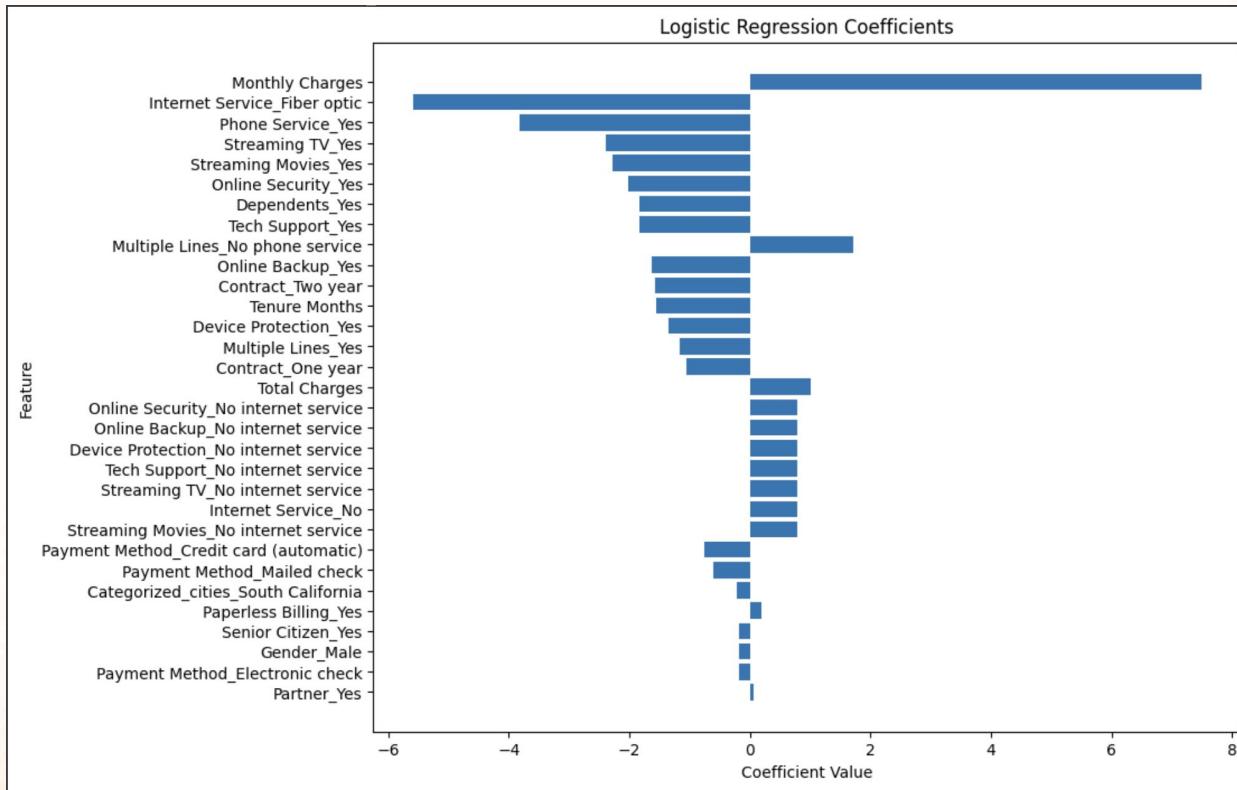
K-means

Model	Accuracy	Precision	Recall	F1 Score
Logistic Regression (After SMOTE)	0.78	0.59	0.76	0.66
Random Forest (After SMOTE)	0.78	0.59	0.66	0.62
SVM with Linear Kernel	0.81	0.69	0.57	0.62
SVM with Polynomial Kernel	0.8	0.72	0.48	0.57
SVM with RBF Kernel	0.81	0.71	0.51	0.59
SVM with RBF Kernel (After Hyperparameter Tuning)	0.81	0.71	0.56	0.63
SVM with RBF Kernel (After Feature Engineering)	0.79	0.65	0.52	0.58
Neural Network	0.78	0.61	0.62	0.61

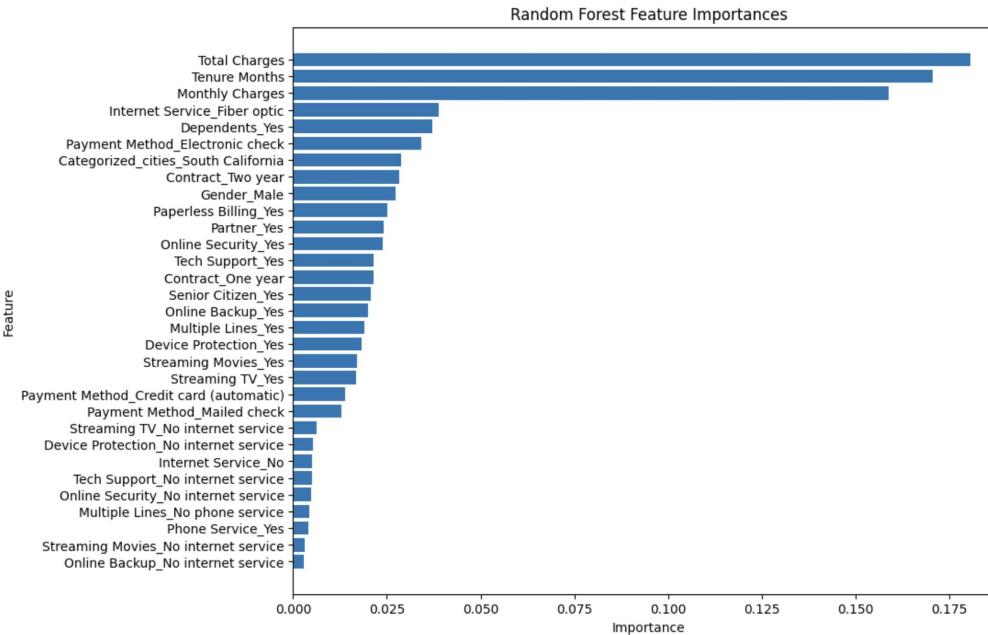
Logistic Regression before SMOTE



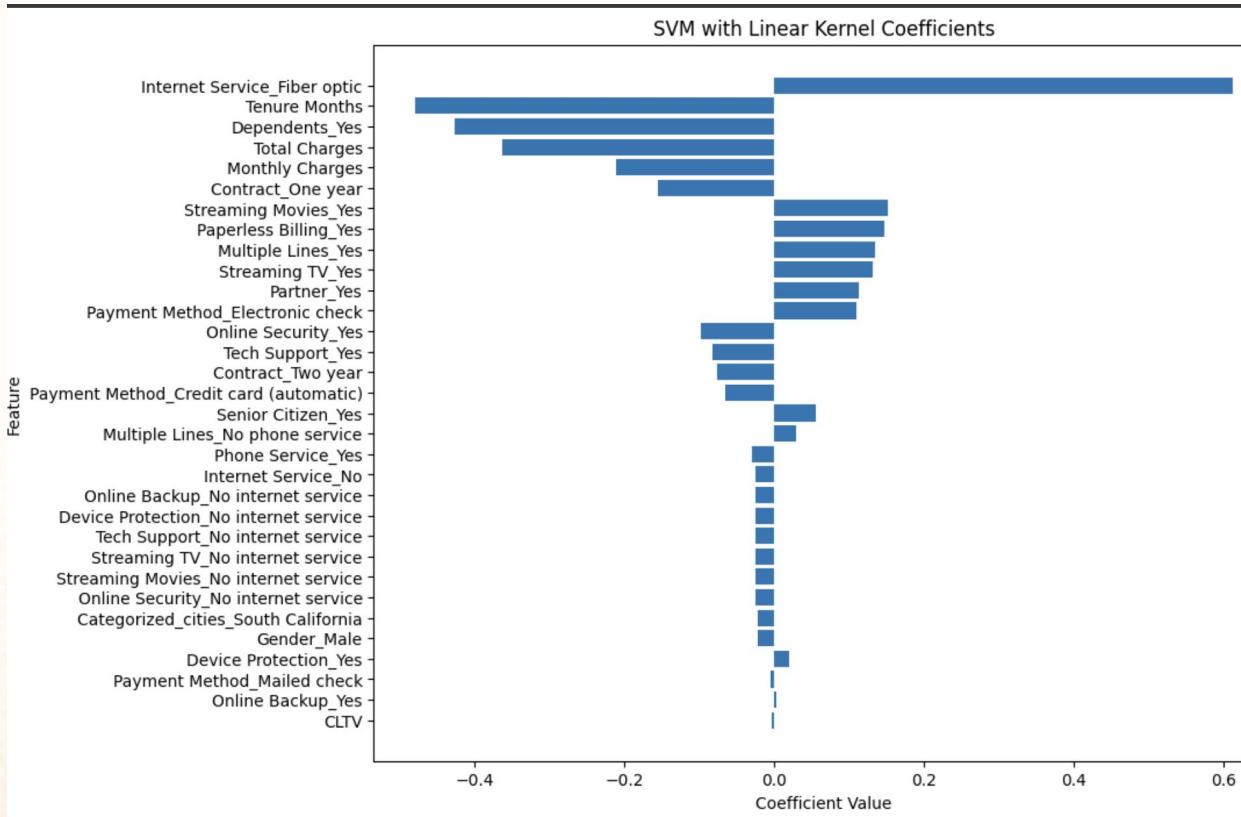
Logistic Regression after SMOTE



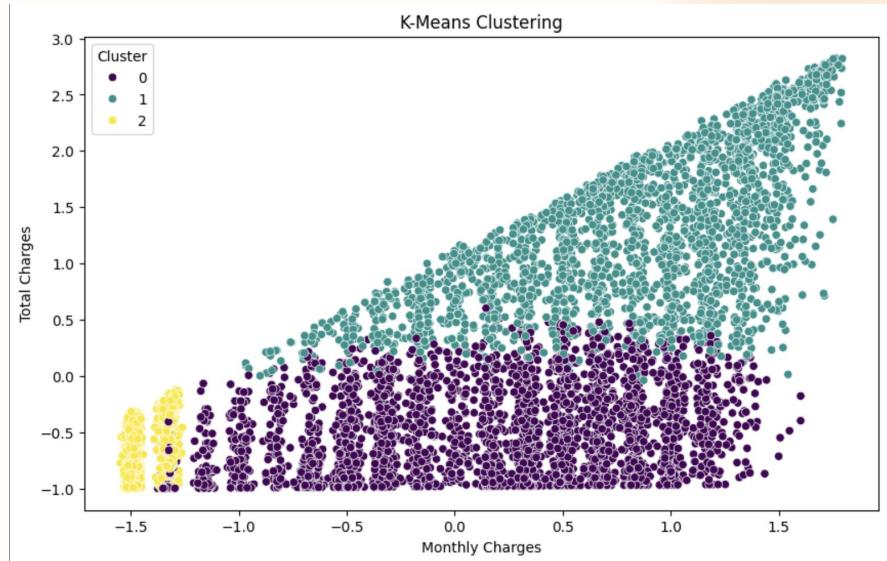
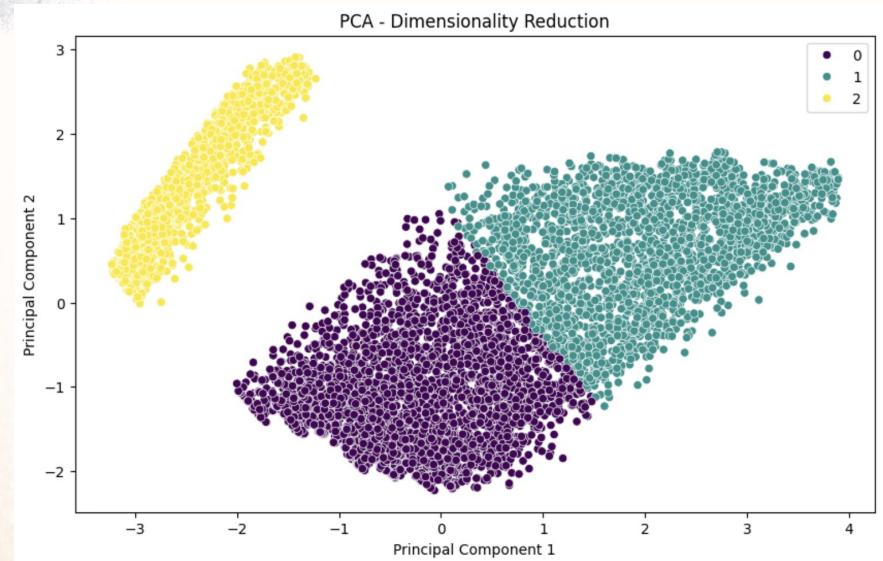
Random Forest Feature Importances



SVM Feature Importances



K-Means



5

CONCLUSION AND RECOMMENDATION

CONCLUSION

Best Model: SVM with RBF kernel
(Hyperparameter Tuning)

- Accuracy: **0.81**
- F1 Score: 0.63

Alternative Option: Logistic Regression (After SMOTE)

- Accuracy: 0.78
- **F1 Score: 0.66**

Reasons for Customer Churn:

- Higher cost of fiber services
- Unmet high expectations for service quality
- Intense competition
- Demographic profile

Important Variables:

- Total and Monthly Charges
- Internet Service (Fiber Optic)
- Tenure Months
- Dependents

Recommendations

Total and Monthly Charges:

- Tiered pricing plans for flexibility and value
- Loyalty discounts and bundled services for cost savings
- Regular billing review and adjustment for fairness and transparency
- Referral programs to reward customers for bringing in new subscribers

Recommendations

Internet Service (Fiber Optic):

- Enhanced customer support for fiber optic users
- Satisfaction guarantees and trial periods for new customers
- Regular feedback collection to improve service quality
- Fiber optic-specific strategies like detailed speed and reliability information, flexible data plans, and regular network upgrades

Recommendations

Tenure Months:

- Loyalty programs with rewards like discounts, exclusive offers, and early access to new features
- Recognition and celebration of customer milestones (e.g., anniversaries)
- Personalized support and account management for long-tenure customers

Recommendations

Dependents:

- Family-friendly plans with generous data allowances, speeds, and family-oriented content and features
- Flexible plans that adapt to changing family needs
- Enhanced customer support with trained staff and dedicated support channels for families

THANKS!

