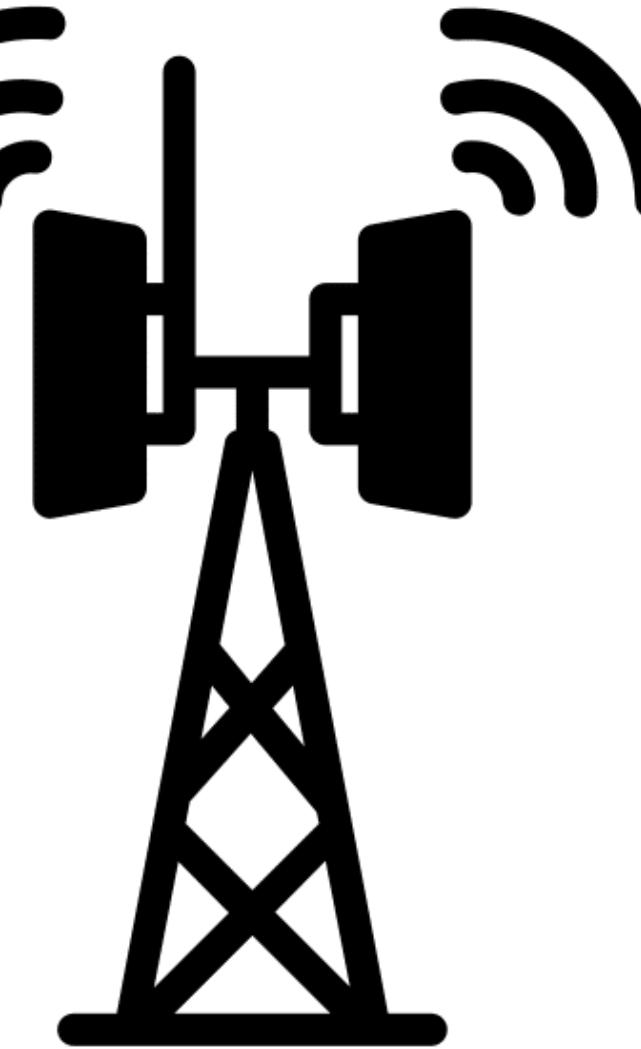
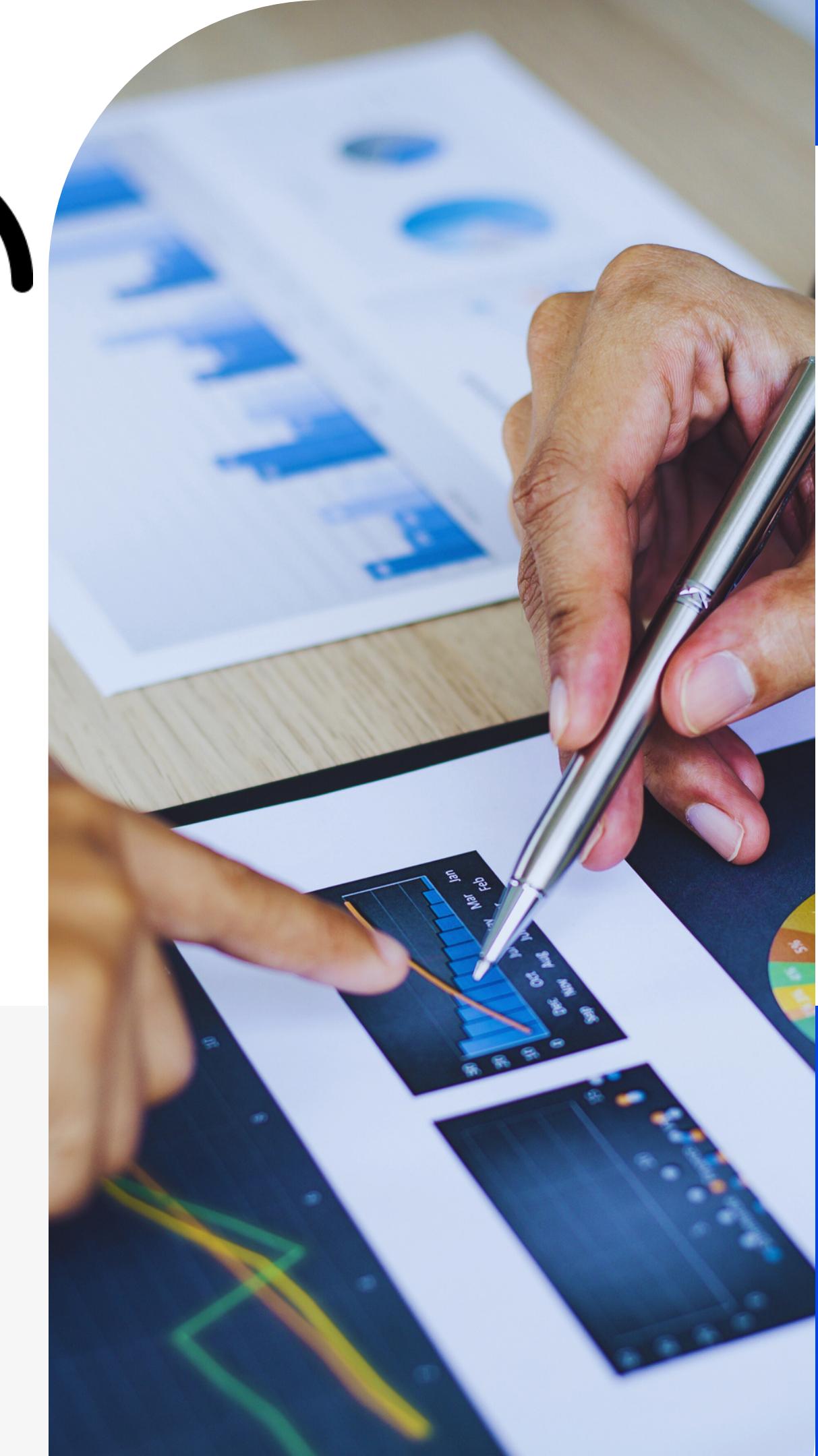


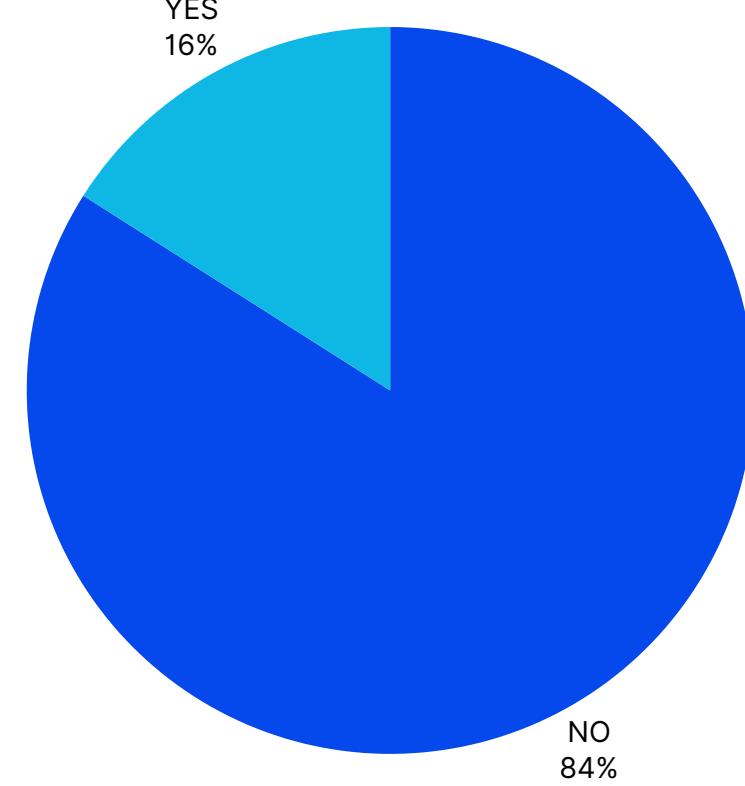
TELECOM CHURN

EDA and ML model

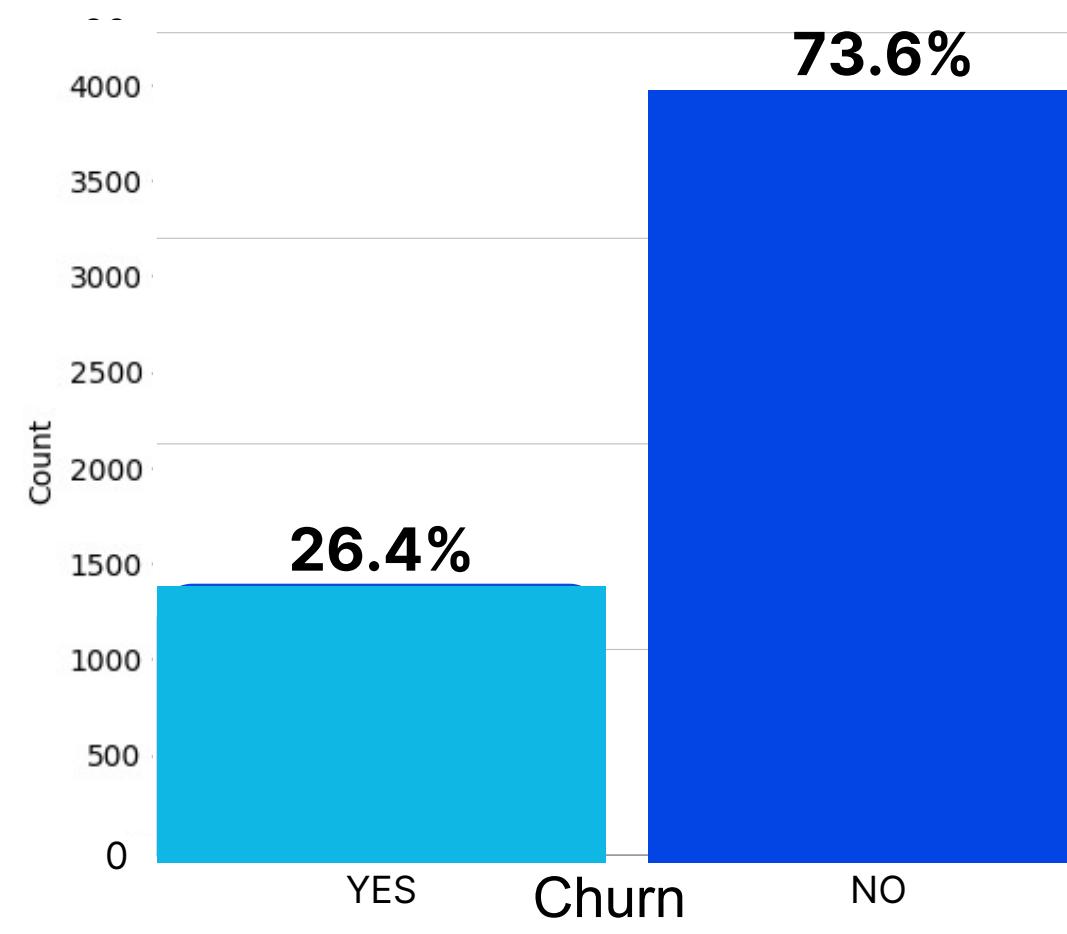


- Yash Bansal (23124044)
- Pranshu Danani (23124025)
- Kshitij Gupta (23124013)
- Rehan Chouhan (23322022)





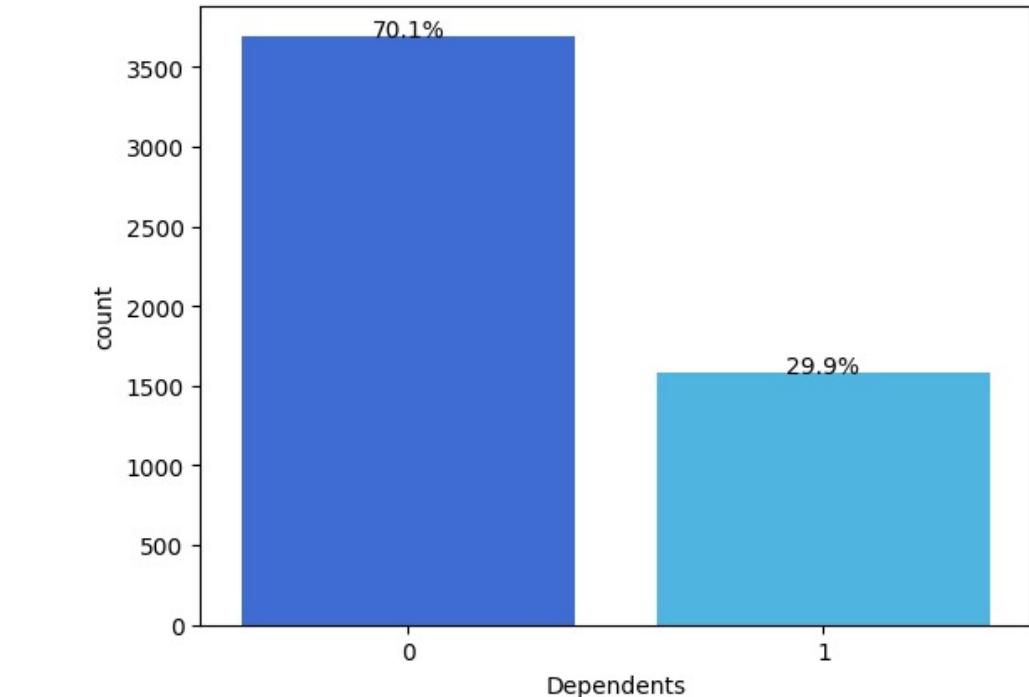
Percentage of Senior Citizens



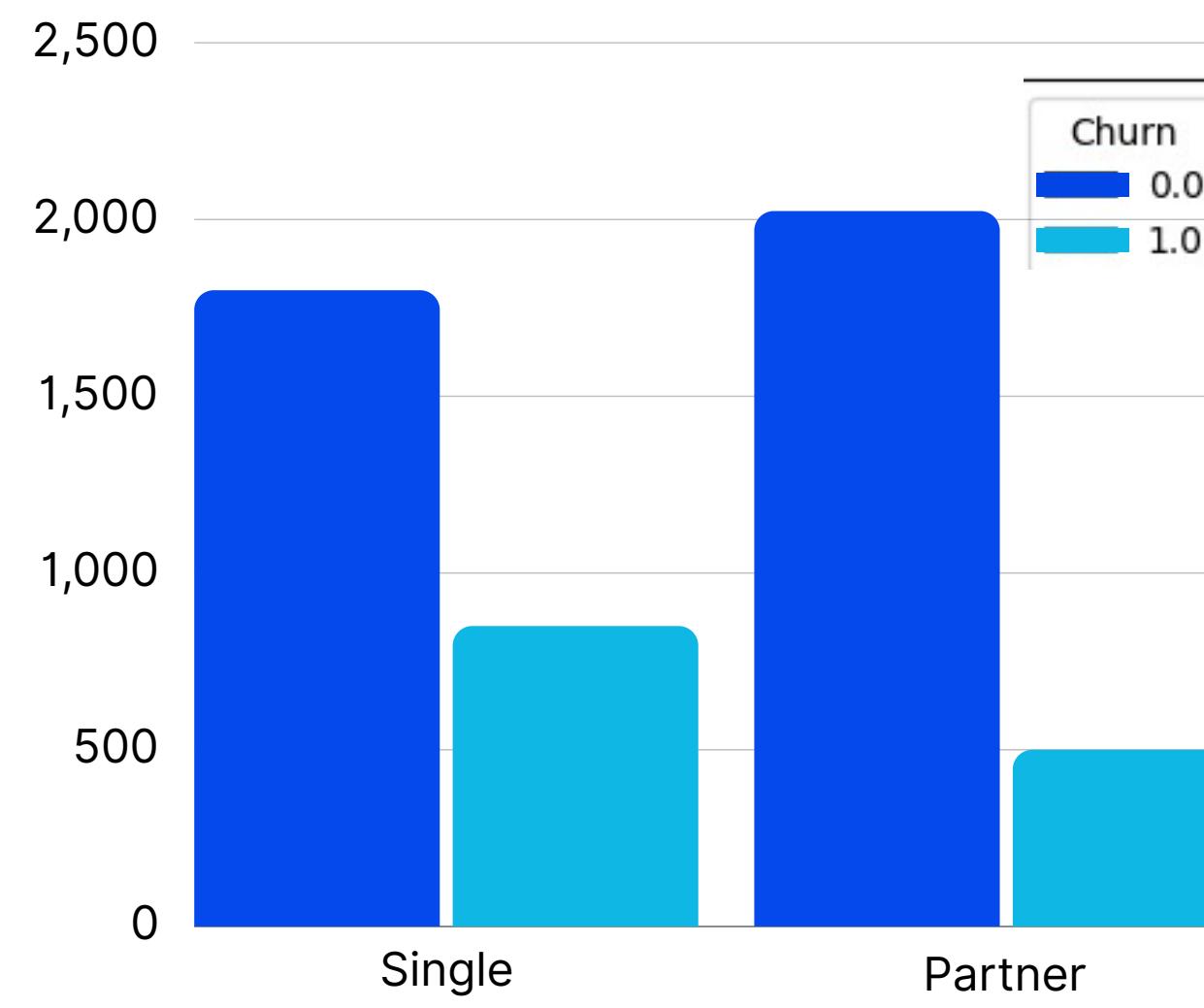
Churn count with percentages



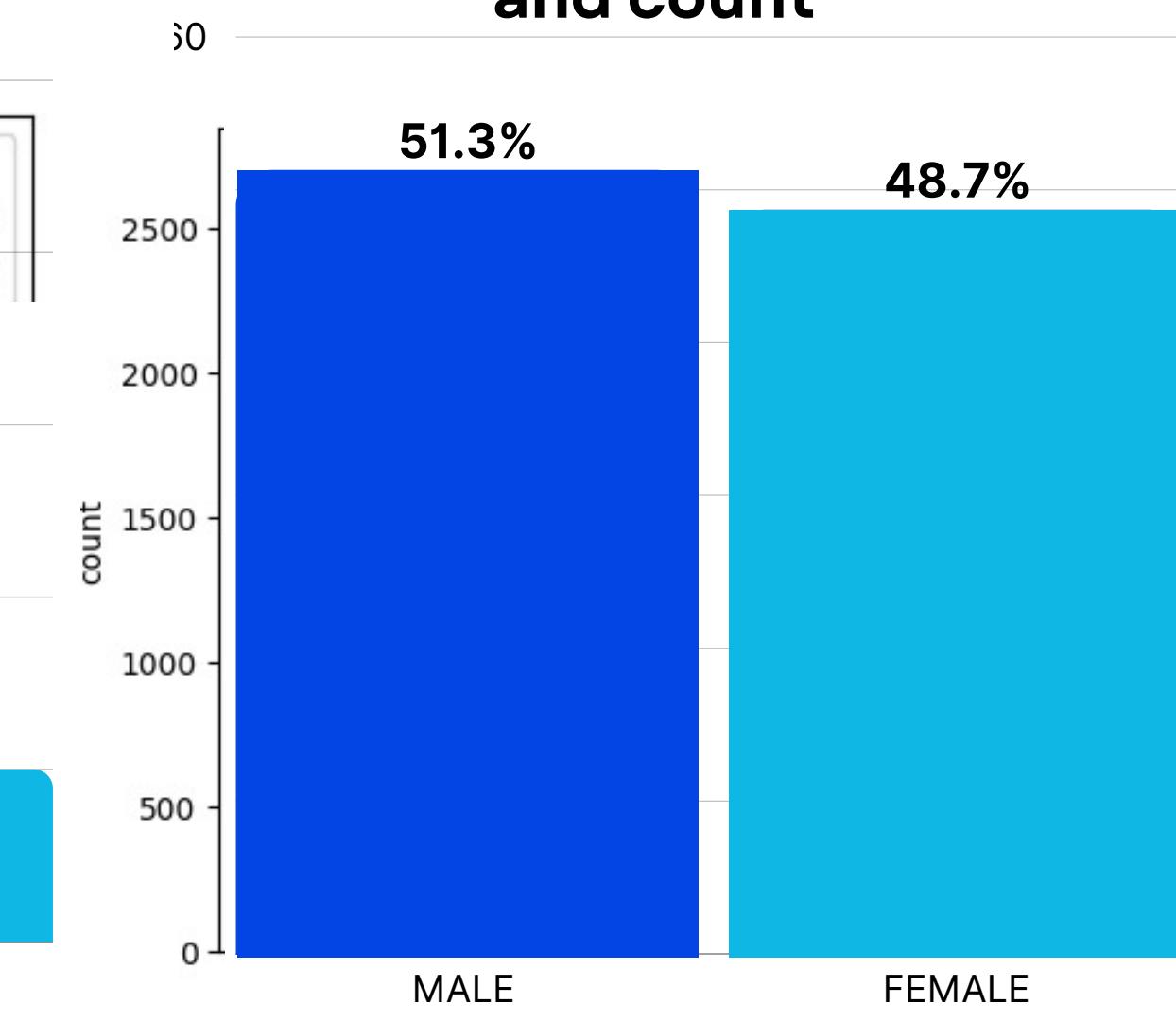
DEMOGRAPHIC ANALYSIS



Dependents percentage and count

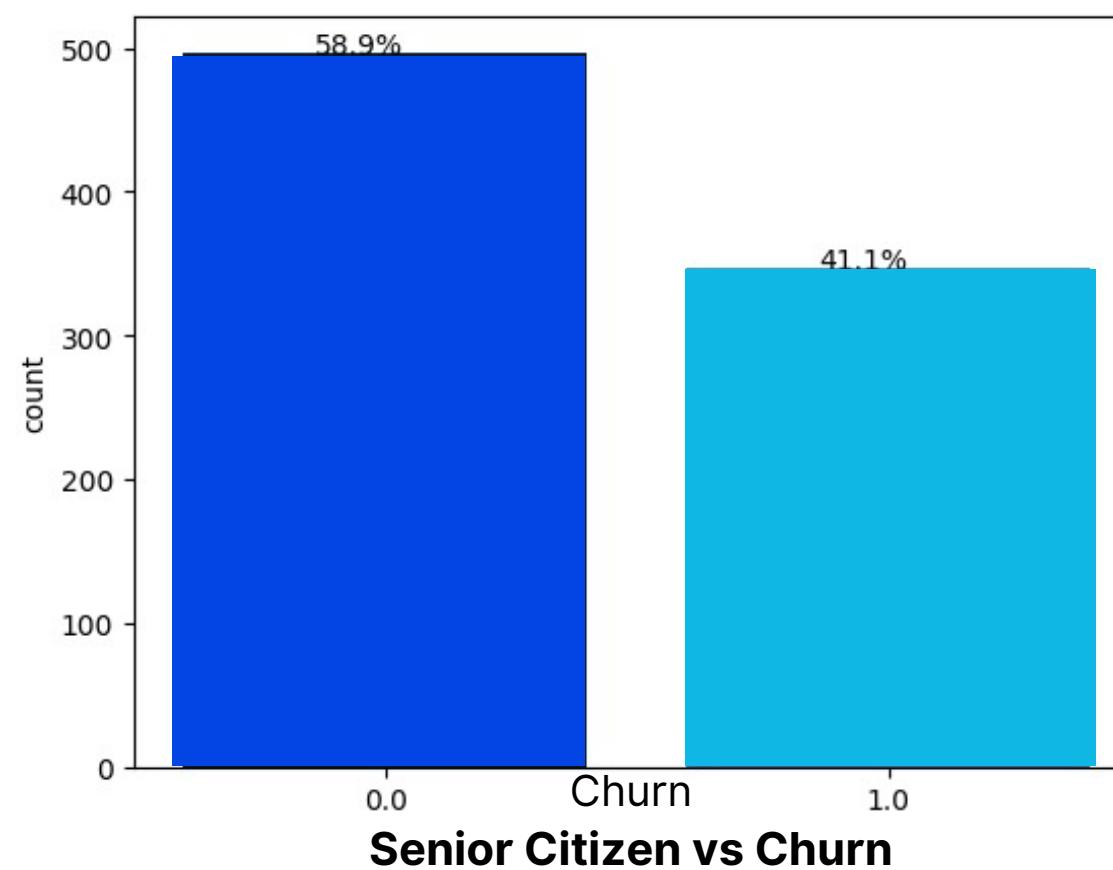


Partner vs Churn



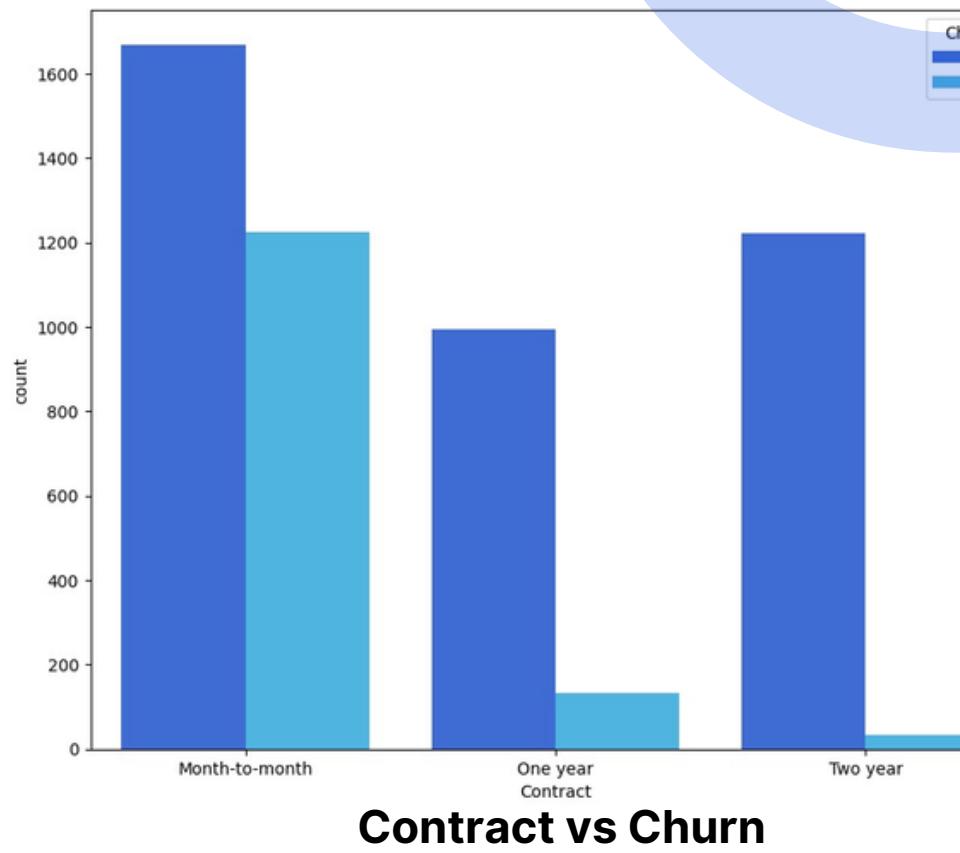
Male-Female count

EDA : 0) UNIVARIATE ANALYSIS FOR CHURN



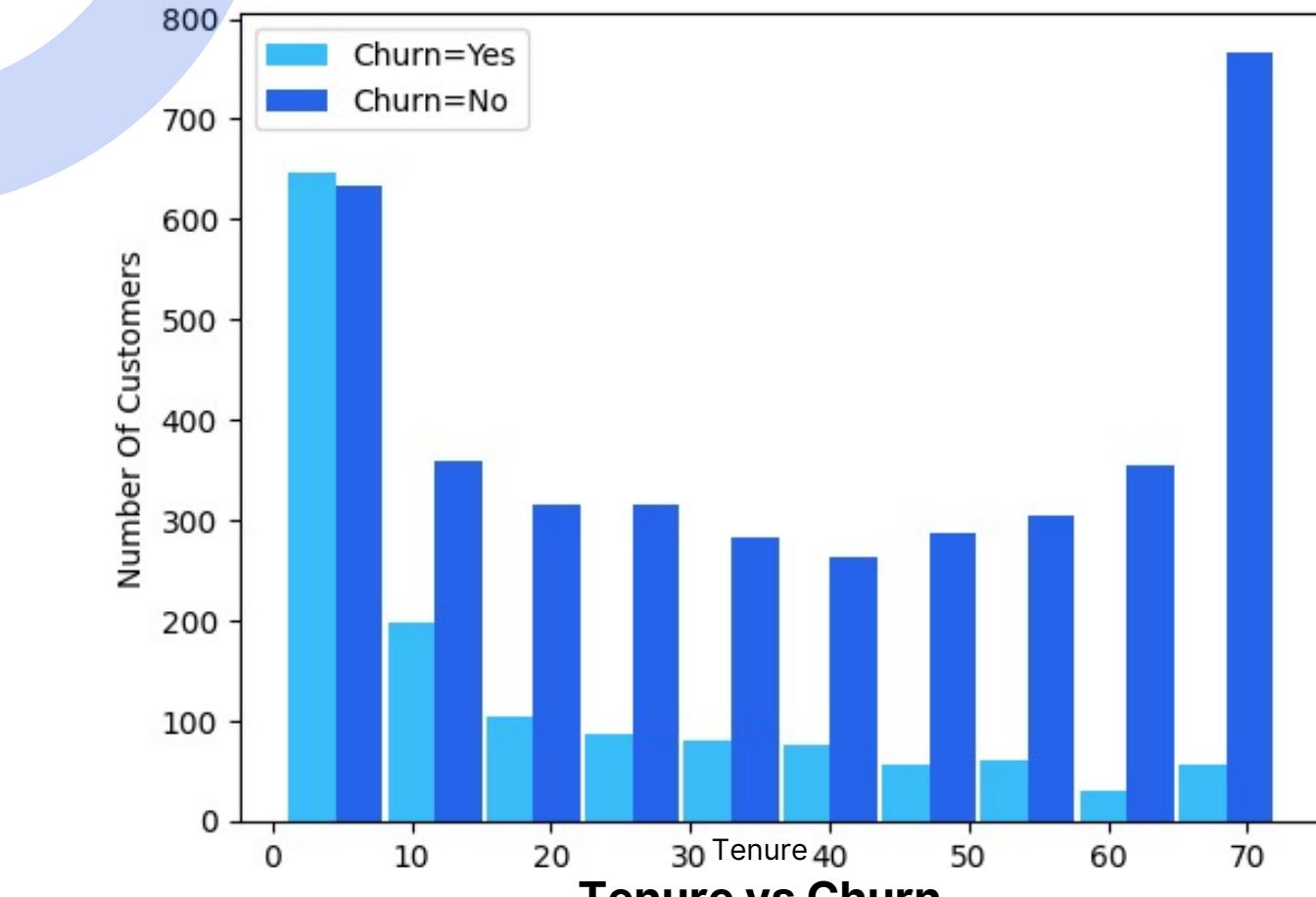
Senior Citizen vs Churn

- Senior citizens are more likely to churn



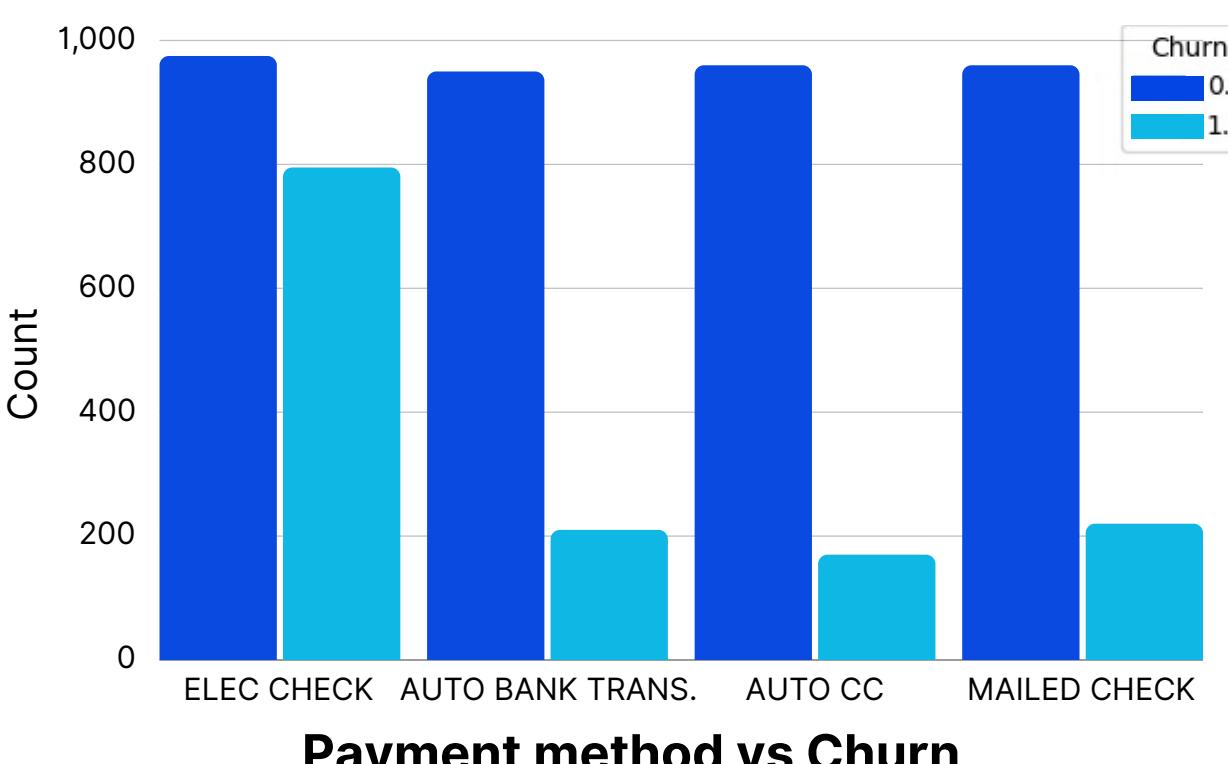
Contract vs Churn

- Month to month plan fails to impress
- 2 year plan works well



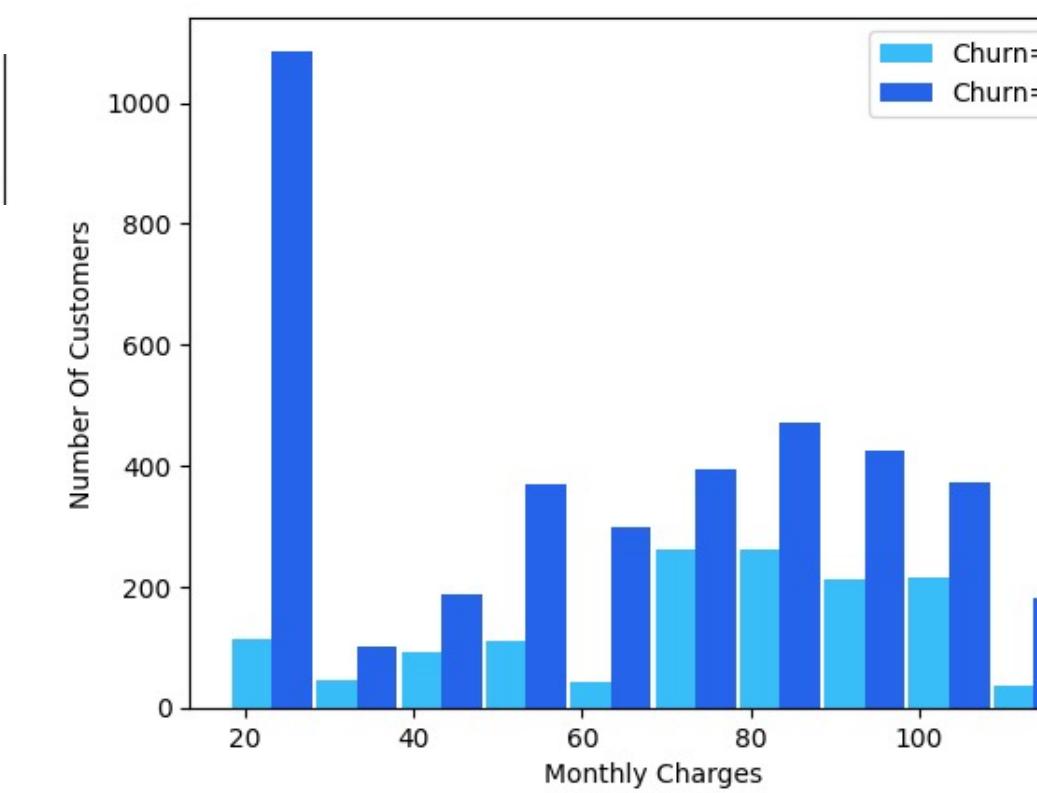
Tenure vs Churn

- Company is unable to retain new customers

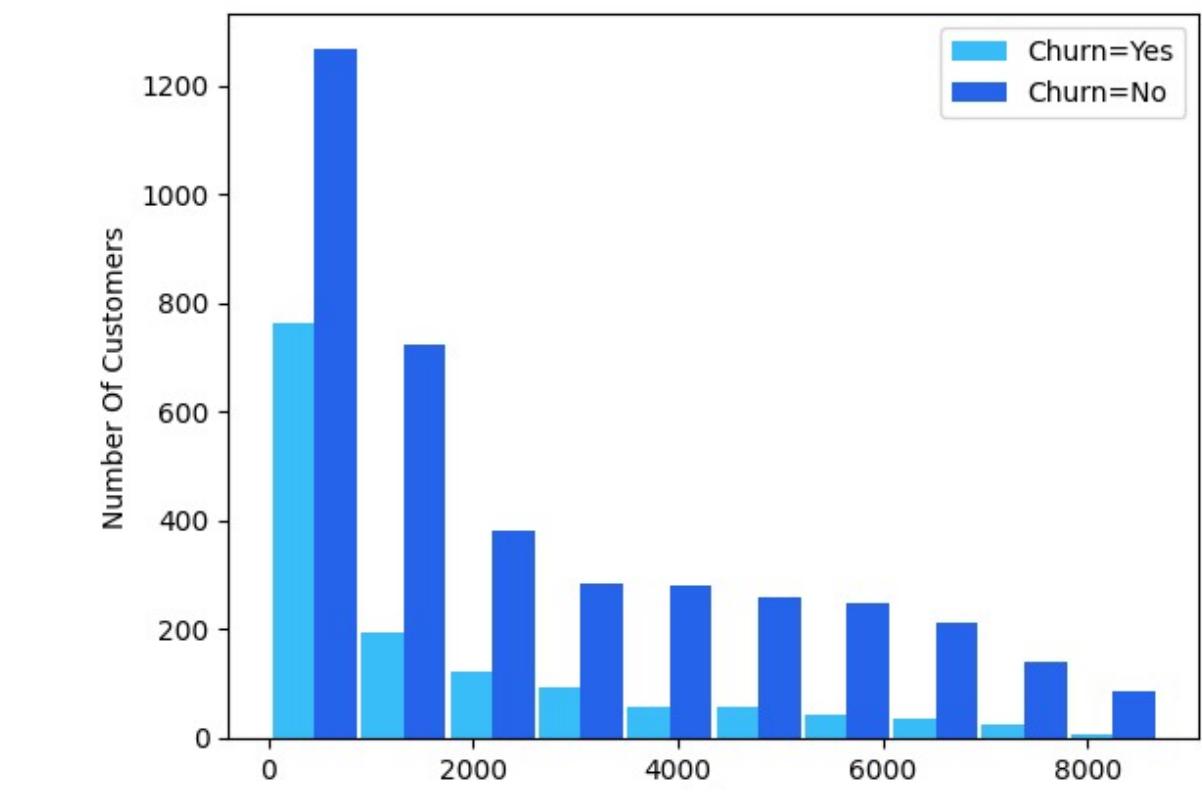


Payment method vs Churn

- Electronic Check has a high churn %age hence needs to be improved



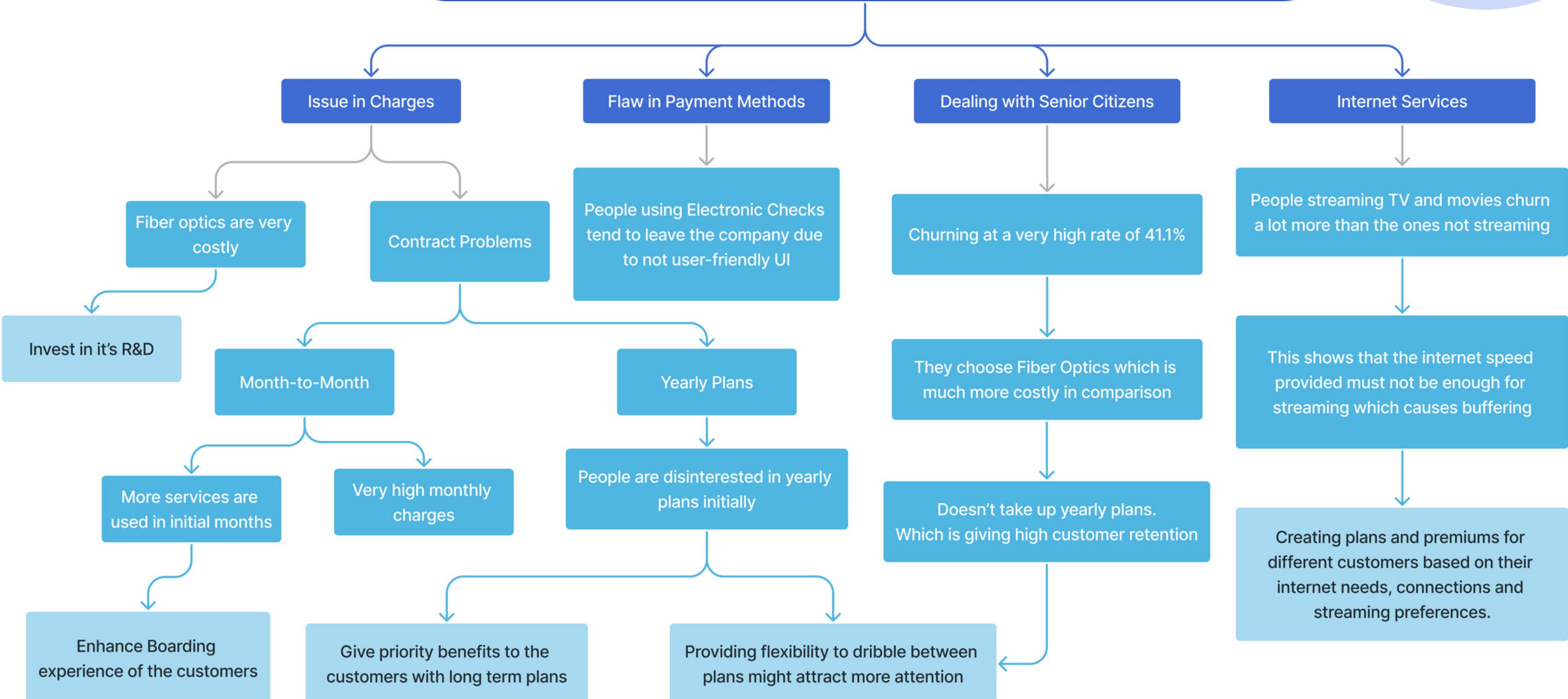
- People having lower monthly charge have less chances of churning and high churn percentage is observable between 70/- and 100/-



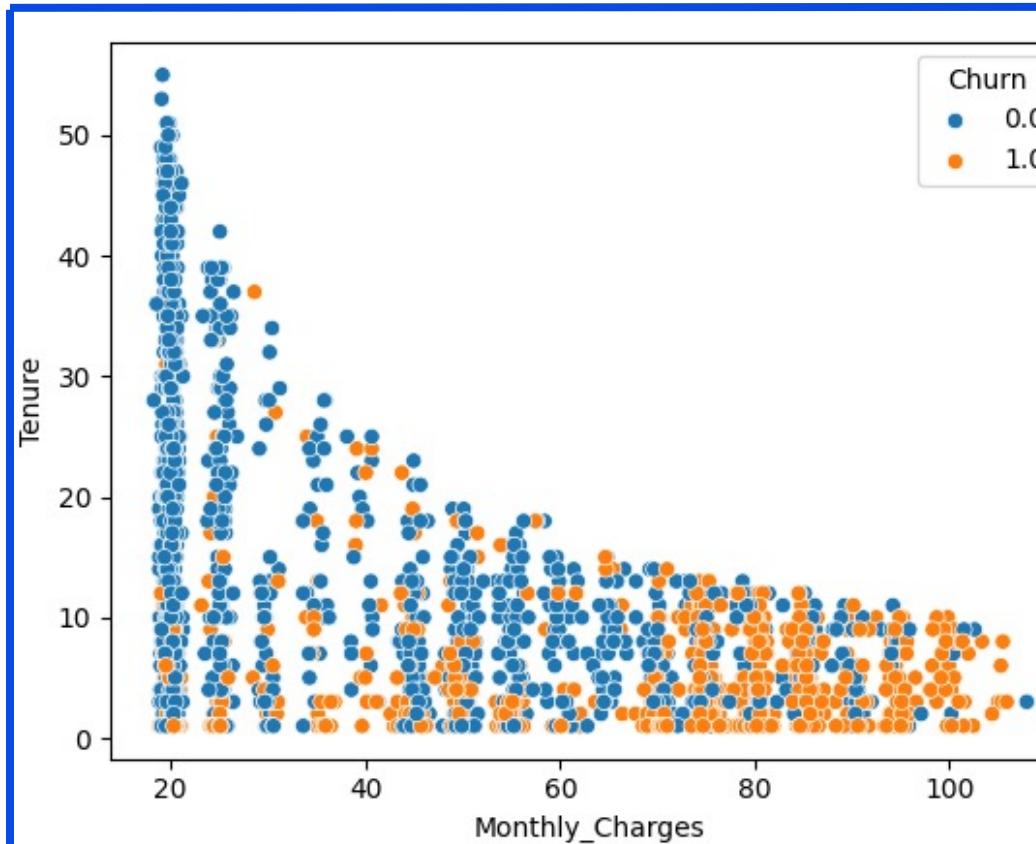
Total Charges vs Churn

- New customers are facing high initial charges forming a negative first impression of the company

PROBLEM: People Churning at a high rate (26.3%).
TARGET: Lowering the churn percent of the company.



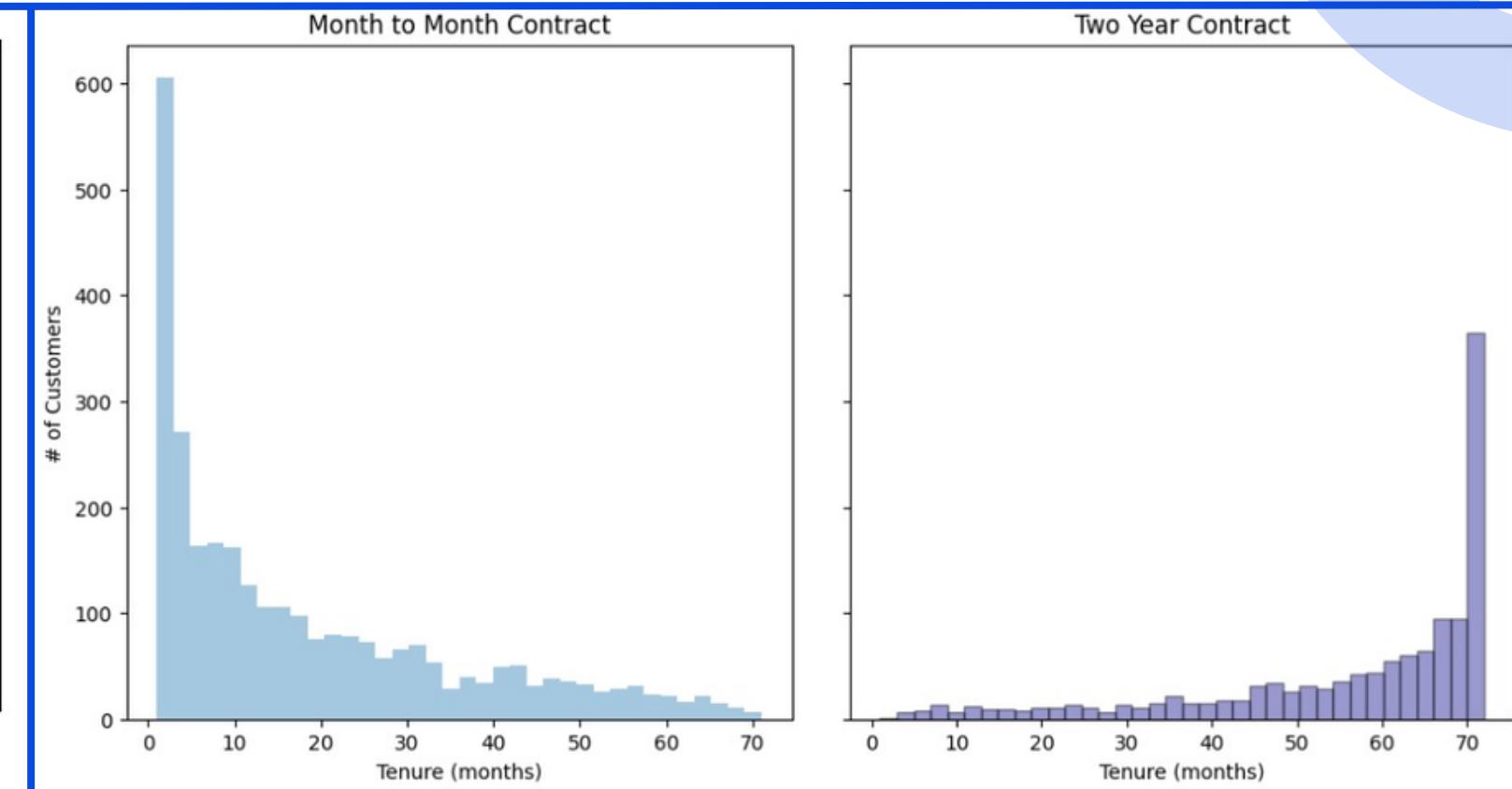
1) CORRELATING MONTHLY CHARGES, TOTAL CHARGES AND TENURE



01 Tenure vs Monthly Charges wrt Churn

We saw people paying **high monthly charges** for **short duration** are very likely to **leave**, whereas people paying **low monthly charges** and having **longer tenures** are likely to **stay**.

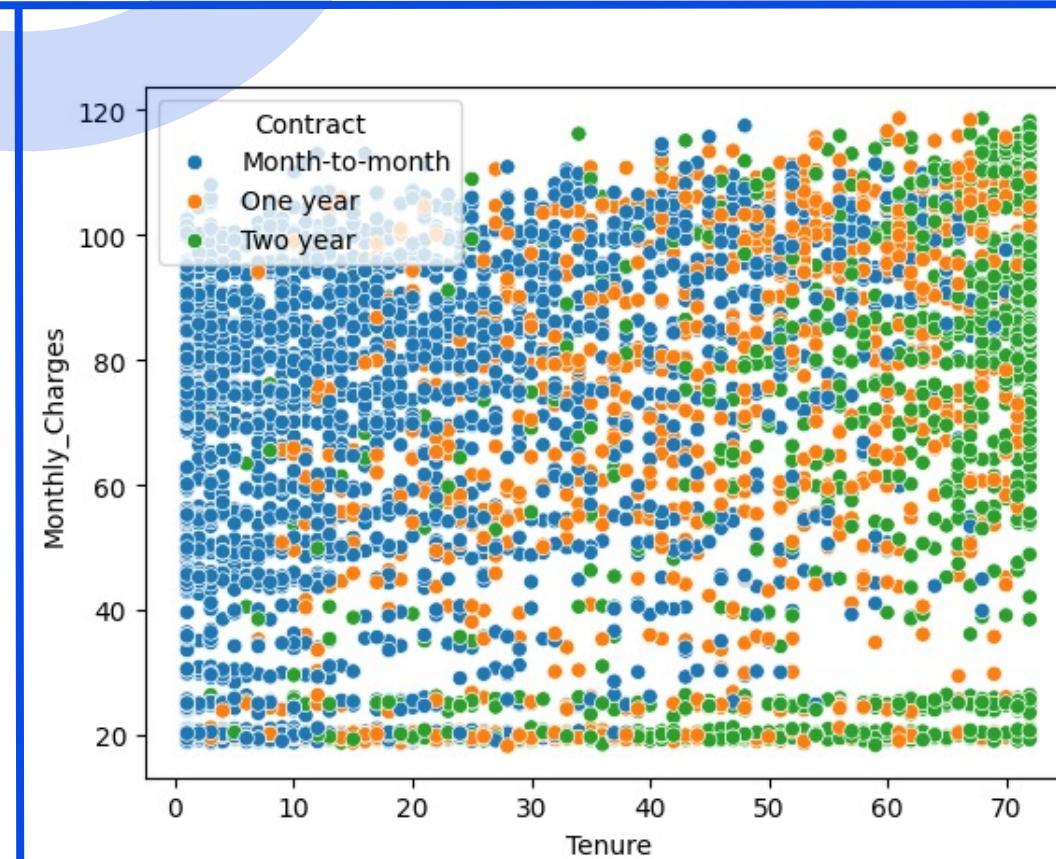
The churn rates escalates as the monthly charges cross **60/-**



02 Investigating the nature of new customers

From the above two graphs its clear that **new customers** are **preferring monthly plans** over yearly plans which showcases that yearly plans are not enough beneficial and attractive to them.

Also **almost half** of the people joining the **month to month** contract are **churning** whereas yearly contracts shows a good customer retention percentage.

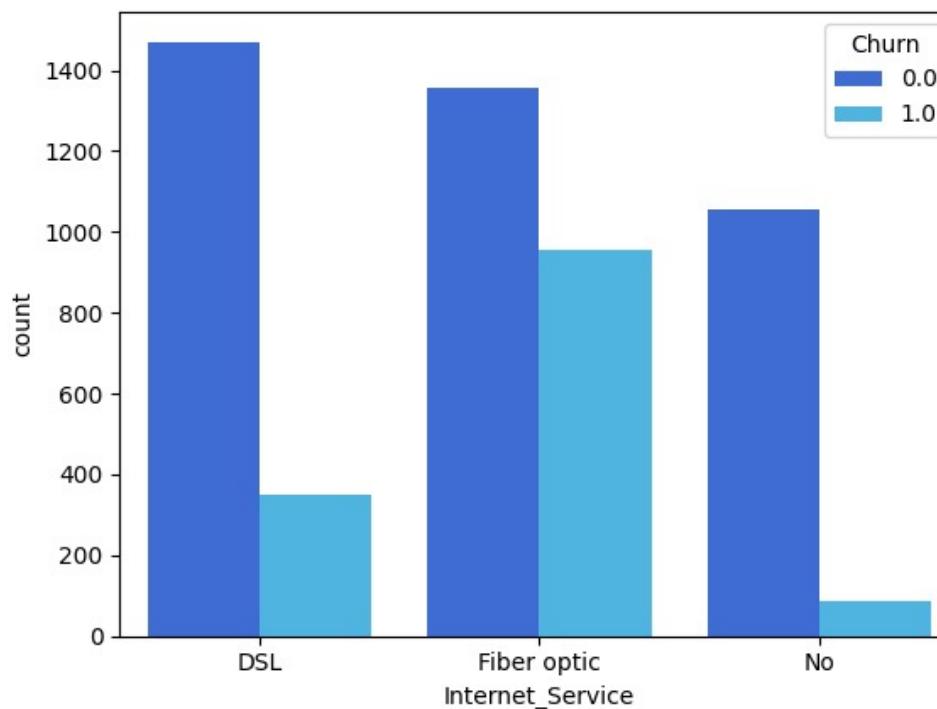


03 Solutions

The company must give exciting offers to new customers and people spending more than **60/-** a month
Make the yearly plans more tempting by :-

- **Loyalty programs:** Reward customers for staying with you with exclusive discounts, priority customer service, or access to premium content or services.

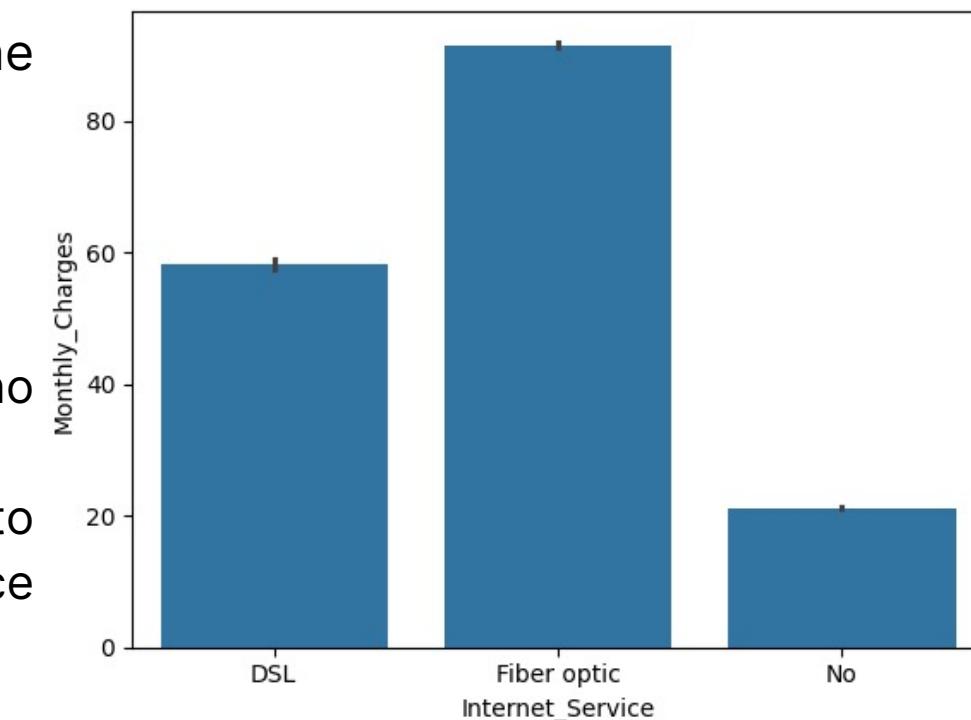
2) EXAMINING INTERNET SERVICES



- People choosing fiber optic as their internet connection have the highest churn.
- Clearly, fiber optics service is the costliest of all three

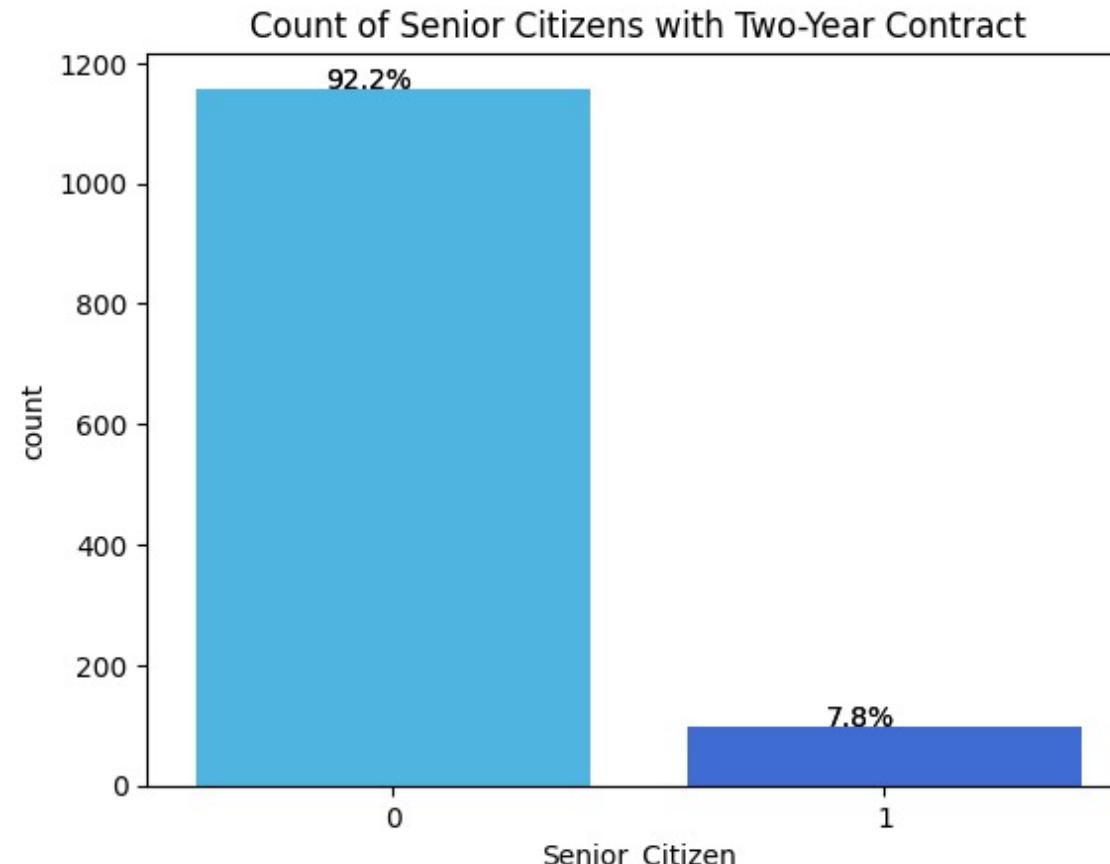
Solutions

- **Transparent pricing:** Offer clear and understandable pricing plans with no hidden fees
- **Customer support:** Invest in responsive customer support channels to address concerns, troubleshoot issues, and provide technical assistance efficiently.
- **Value-added Service:** Invest in its R&D to make it cheaper

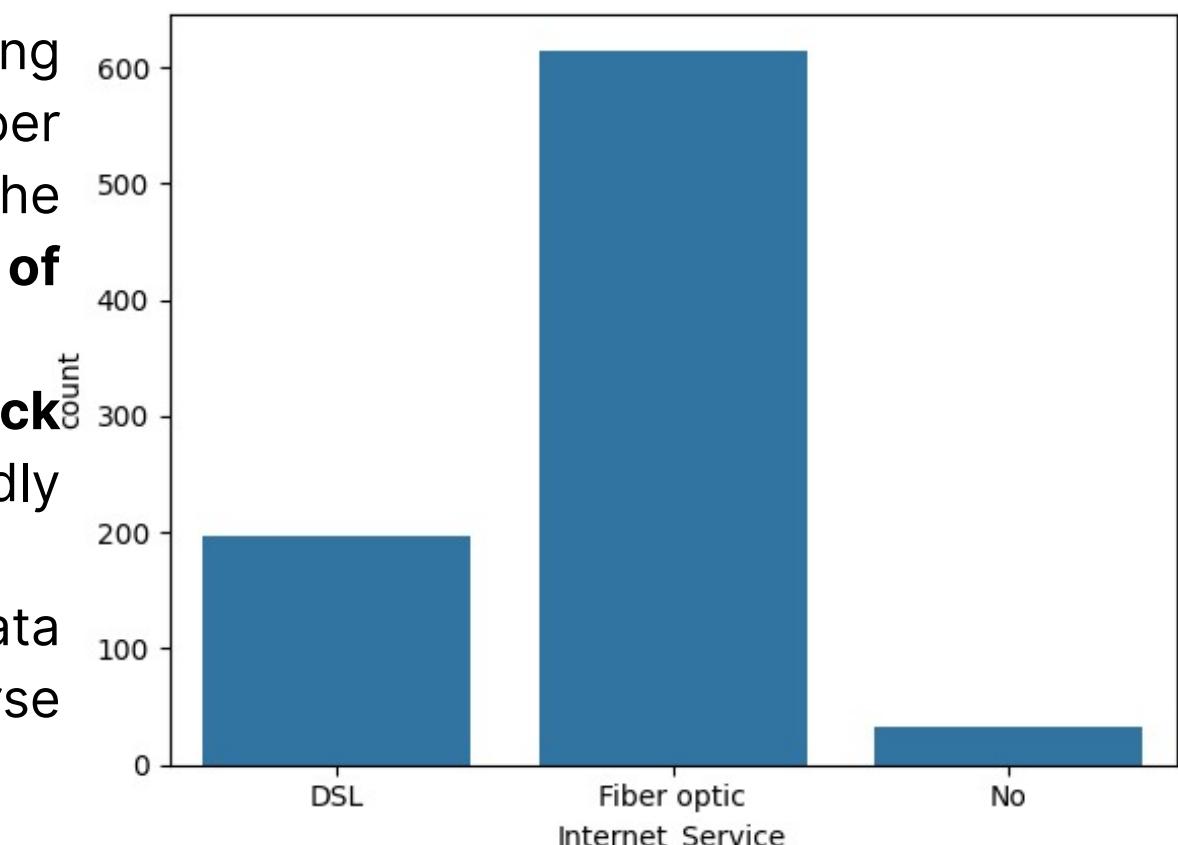


3) ANALYSING HIGH CHURN OF SENIOR CITIZENS

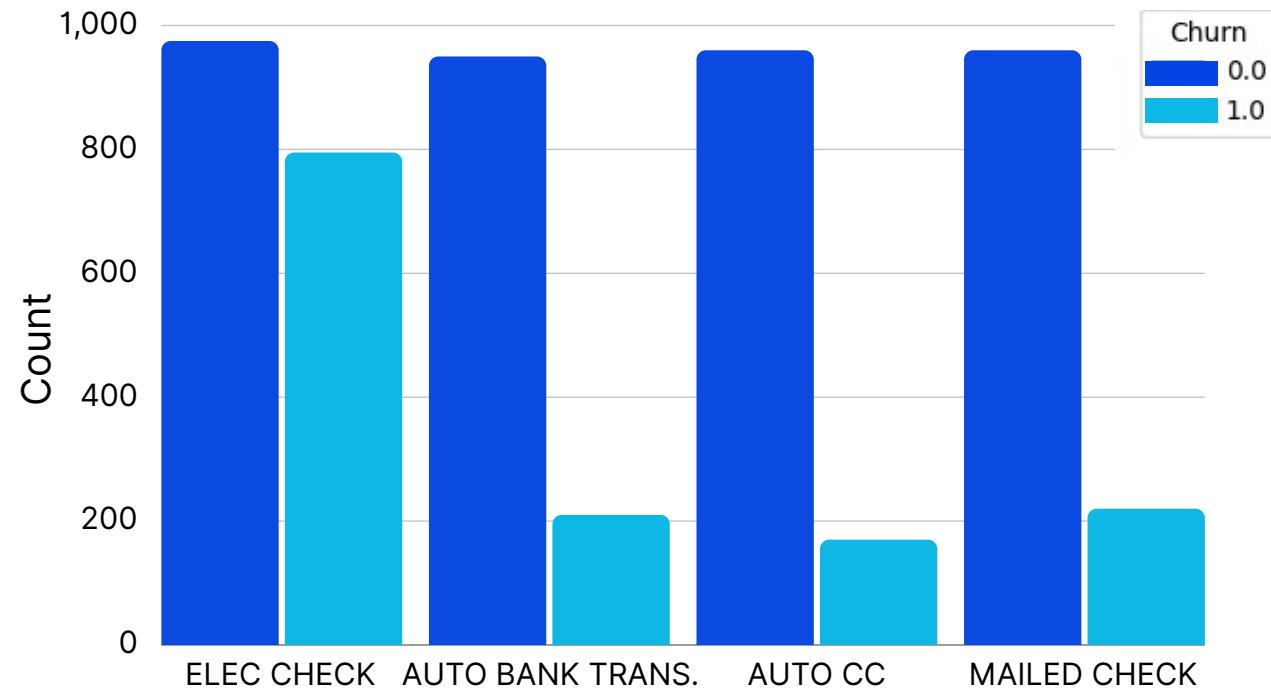
- Senior citizens are churning at a rate of **41.1%** compared to norm of **23%**



- As we can see, senior citizens aren't preferring two year contracts and they're buying fiber optic connection which out of all three is the costliest one. This in turn shows the **lack of awareness**.
- The company has to introduce **feedback mechanism** and a help desk, user friendly interfaces specially designed for them.
- **Personalized service:** Offer flexible data packages and bundle options to cater to diverse customer preferences



4) INSPECTING PAYMENT METHODS



- **Observation:** Electronic check causes high churn
- **Possible problems:**
 - i) **Fraud:** Fake checks and stolen bank account information can lead to financial losses for both parties.
 - ii) **Delays:** Clearing checks can take several days, impacting cash flow and potentially causing service disruptions.
 - iii) **Bad UI and UX experience:** Entering bank account information and verification processes can be time consuming

- **Solutions:**
 - i) **Enhanced security:** Implement stricter verification and authentication protocols, including multi-factor authentication and real-time fraud detection systems.
 - ii) **Faster processing:** Partner with faster-clearing ACH networks
 - iii) **Streamlined workflows:** Optimize online interfaces and mobile apps for user-friendly data entry and error prevention.
 - iv) **Better UI n UX :** invest in technology to improve UI and UX experience

MACHINE LEARNING MODEL



Data Pre-Processing

Dropping unnecessary columns, scaling and converting to dummies

Splitting Data

We split our training data to test different ML models

Decision Tree

Random Forest

Gradient Boosting

Logistic Regression

We used SMOTEENN to enhance training data which in turn increases the model accuracy

FLOW OF ML MODEL

- **Standardize** Data
- We **split our data** to test different ML models
- We observed that the **accuracy was around 71%** and as it's an **imbalanced dataset**, we shouldn't consider accuracy as our metrics to measure the model, as **accuracy is cursed** in imbalanced datasets.
- Hence, we need to check recall, precision & f1 score for the minority class, and it's quite evident that the **precision, recall & f1 score is too low** for Class 1, i.e. churned customers.
- Hence, moving ahead, we call **SMOTEENN (Up Sampling + ENN)** to resample our data.
- Trying **Decision Tree** and **Random Forest** Classifier with resampled data.
- We compare different models along with **boosters** to see which gives the best result.
- **Gradient Boosting** has the **best performance(accuracy:96.4%)** , so we used this model on our test data. Results of training data with the final model is on the side.

Churn	Precision	Recall	F1-Score
0	0.96	0.97	0.96
1	0.97	0.96	0.97

EXECUTIVE SUMMARY

- 1) Demographic Analysis: percentage and count based on gender, senior citizens, partners and dependents
- 2) Graphical analysis of parameters which have high correlation with churn
- 3) We drew an Issue tree along with mentioning a general solution for each problem and insight
- 4) From the 5th slide, we analyzed potentially problematic points significantly increasing the churn rate, namely:-
 - Low customer retention rate
 - High monthly charges
 - Fiber optics
 - Senior citizens
 - Electronic check
- 5) Tested different ML models to find the best fit for the given data set,

THANK YOU

FOR YOUR ATTENTION

