CONNECTTEL
CUSTOMER CHURN PREDICTION

Report by: Amosun Abiodun

COMPANY BACKGROUND

- ConnectTTel is a leading telecommunications company at the forefront of innovation and connectivity solutions. With a strong presence in the global market, ConnectTTel has established itself as a trusted provider of reliable voice, data, and Internet services. Offering a comprehensive range of telecommunications solutions, including mobile networks, broadband connections, and enterprise solutions.
- ConnectTTel caters for both individual and corporate customers, they are committed to providing exceptional customer service and cutting-edge technology. ConnectTTel ensures seamless communication experiences for millions of users worldwide.

ConnecTTel Business Challenges

ConnecTTel Telecom Company is confronted with the urgent imperative to tackle customer churn, a substantial threat to its business sustainability and growth.

The company's existing customer retention strategies lack precision and effectiveness, leading to the attrition of valuable customers to competitors.

Aim of the Project

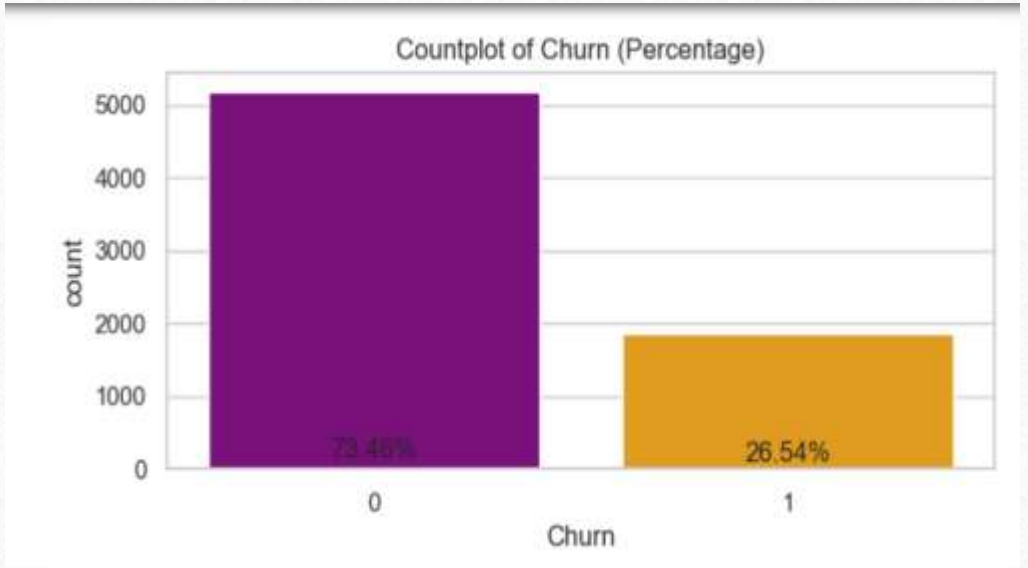
To develop a robust customer churn prediction system. By leveraging advanced analytics and machine learning techniques on available customer data.

To appropriately predict customer churn and implement targeted retention initiatives and customer loyalty

Data Summary

The Dataset contains precisely 21 features which are mostly categorical in nature

Only 3 Numerical features. It also has 7043 columns and 11 missing values only.

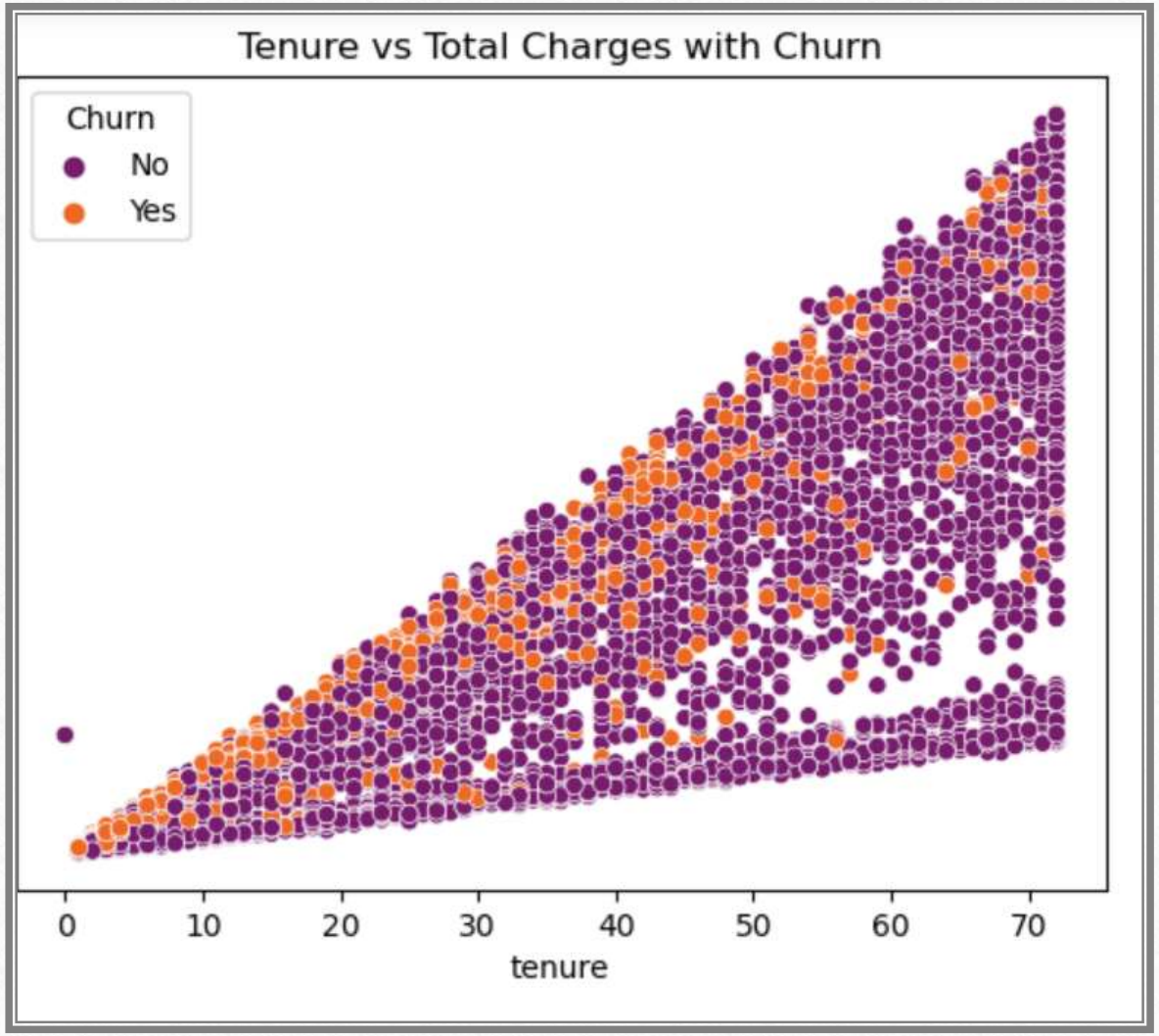


EDA Summary

Presently, the churn rate stands roughly at 27 percent. It may seem relatively small, but its significance should not be underestimated.

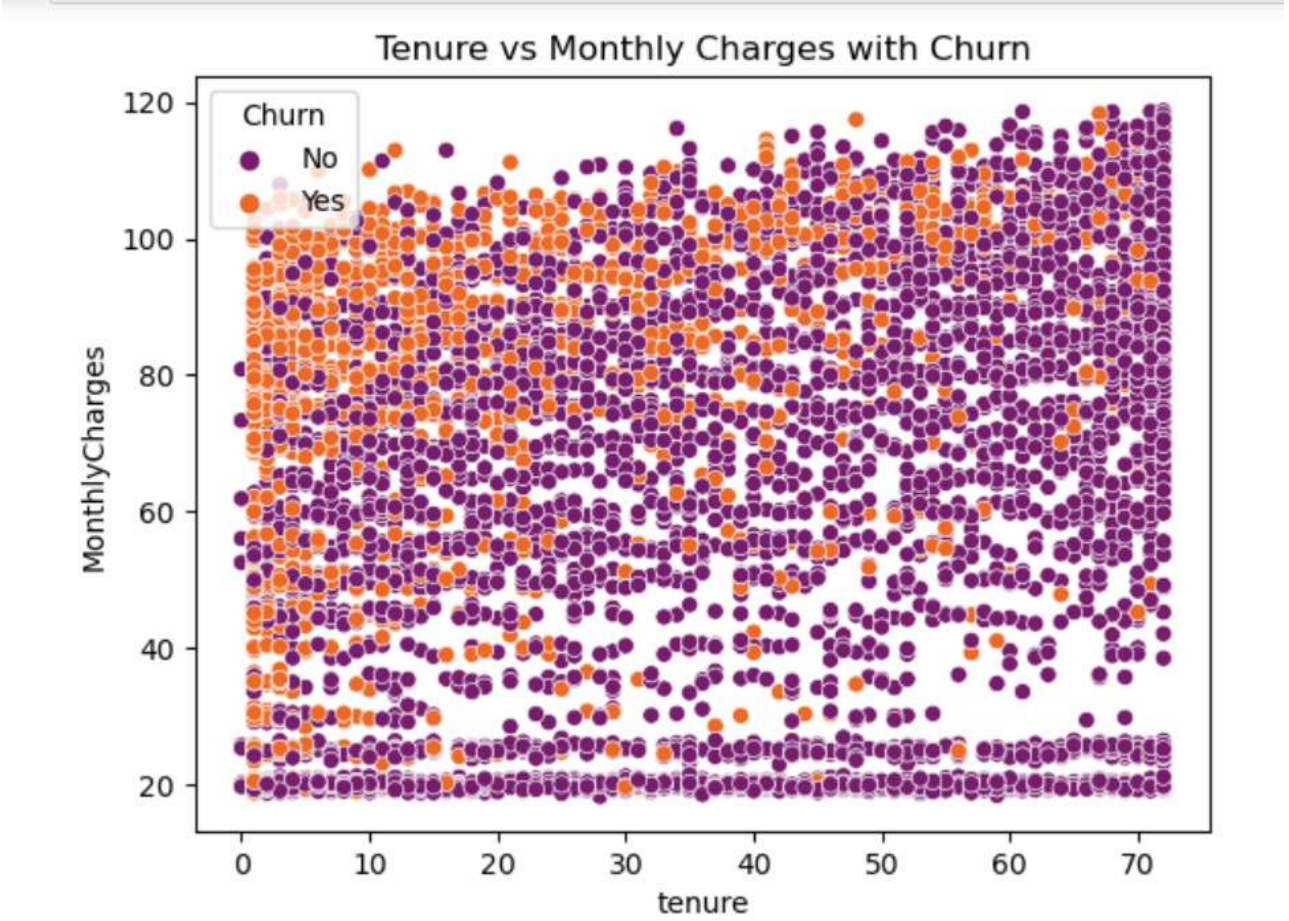
Numerical Features Analysis

- The scatter plot reveals a trend where customers tend to churn as their total charges for subscribed services increase over time. The analysis indicates that longer customer tenure correlates with higher total charges and subsequent churn. Despite a smaller proportion of customers churning, further investigation is necessary to better understand and address the needs of this specific group.



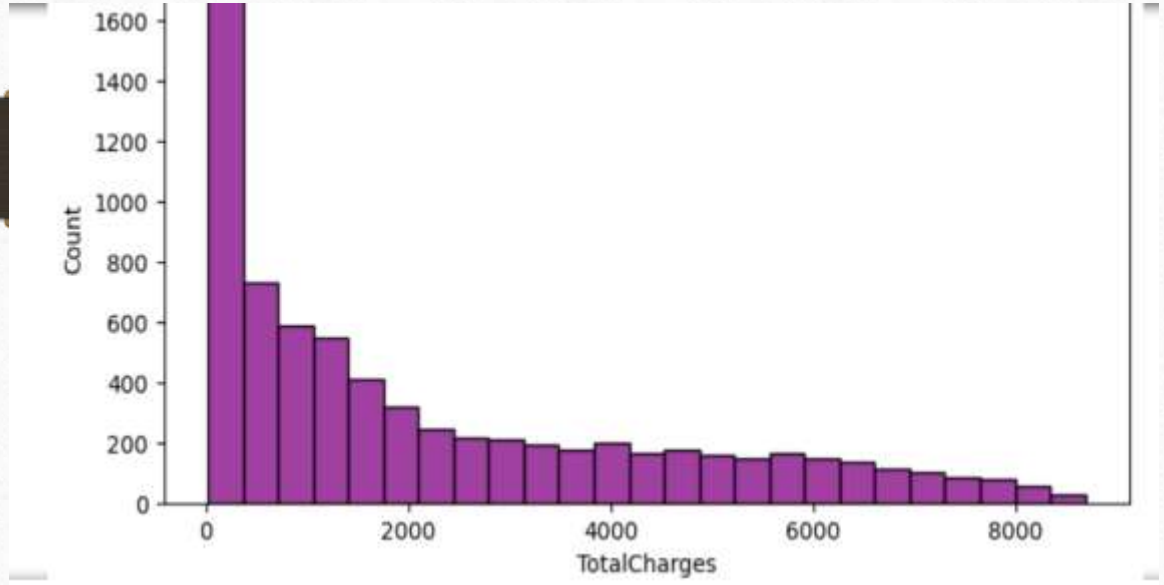
Numerical Features Contd.

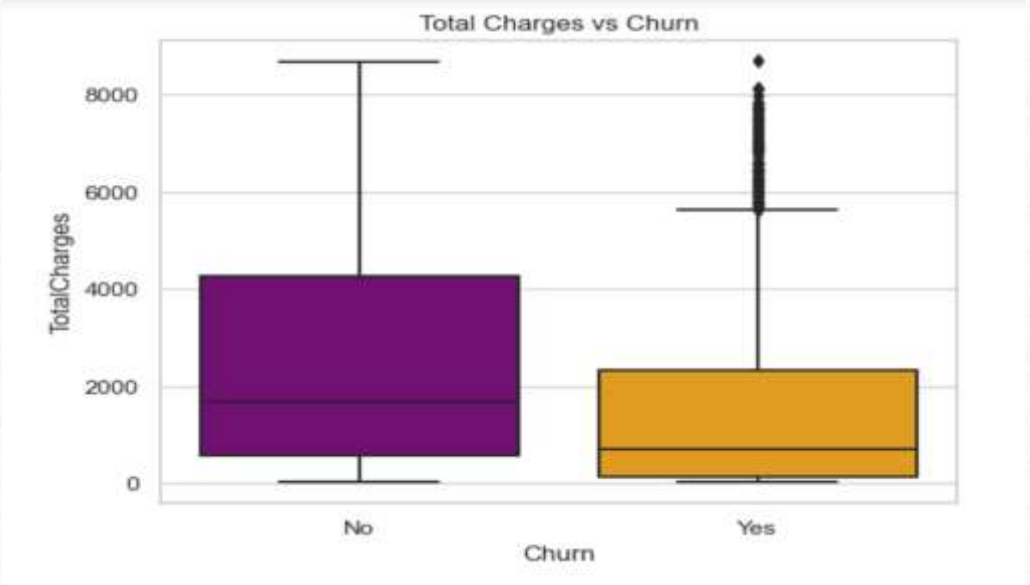
- Observation
  - Monthly Charges can not be said to be the reason for churning overtime.
  - Though churning is slightly common among those customers that have been with the company less than 3 years. Further investigation is still needed to understand the churning pattern much more.



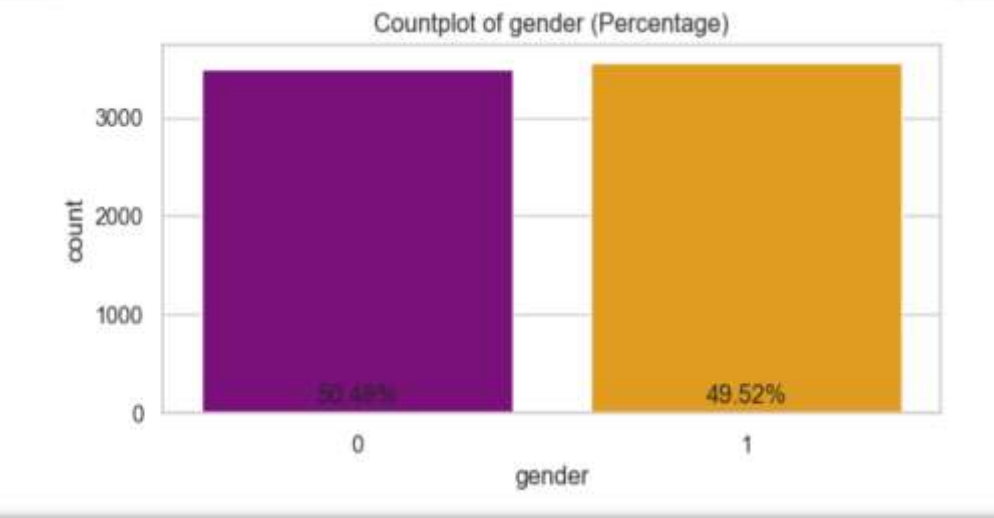
Numerical Contd.

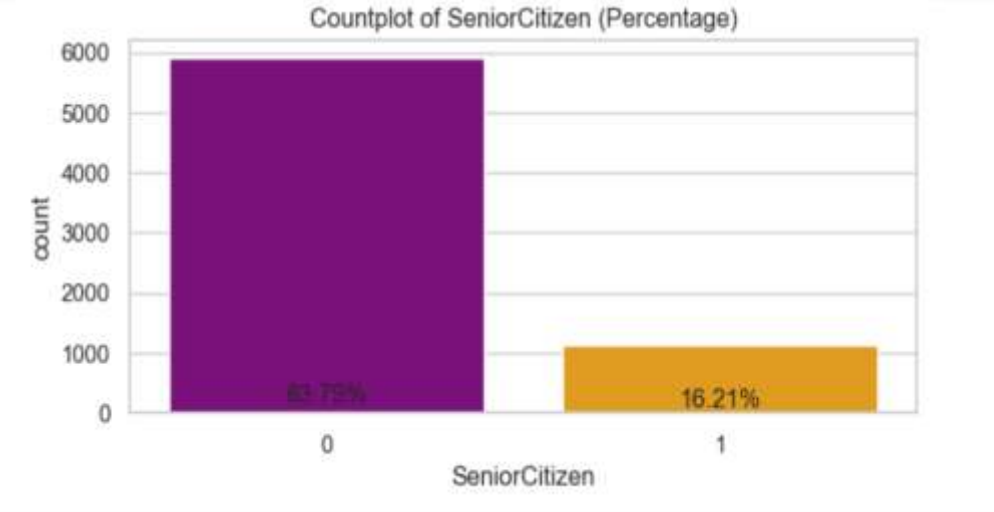
The majority of churn attributed to Total Charges is primarily observed among customers paying less than 2000.





Categorical Data Analysis

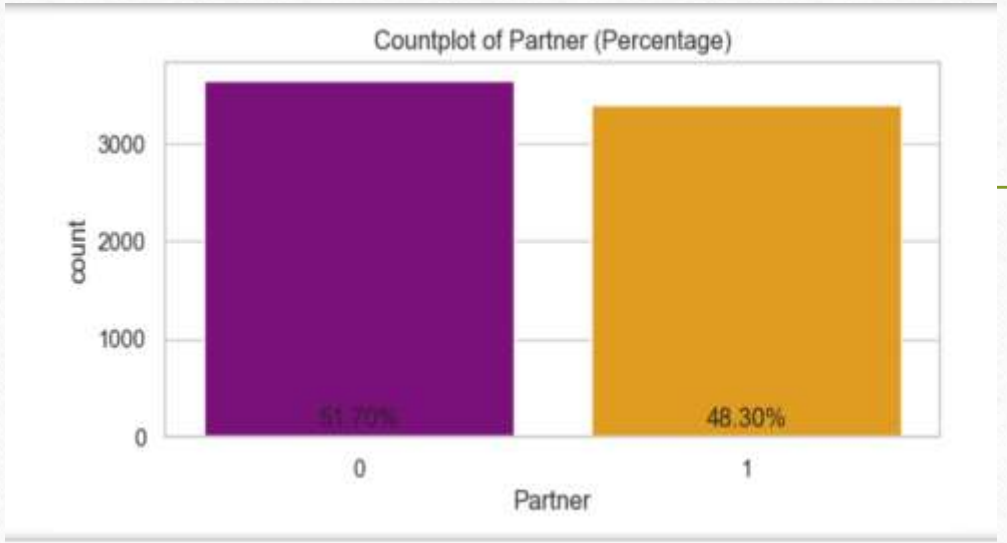


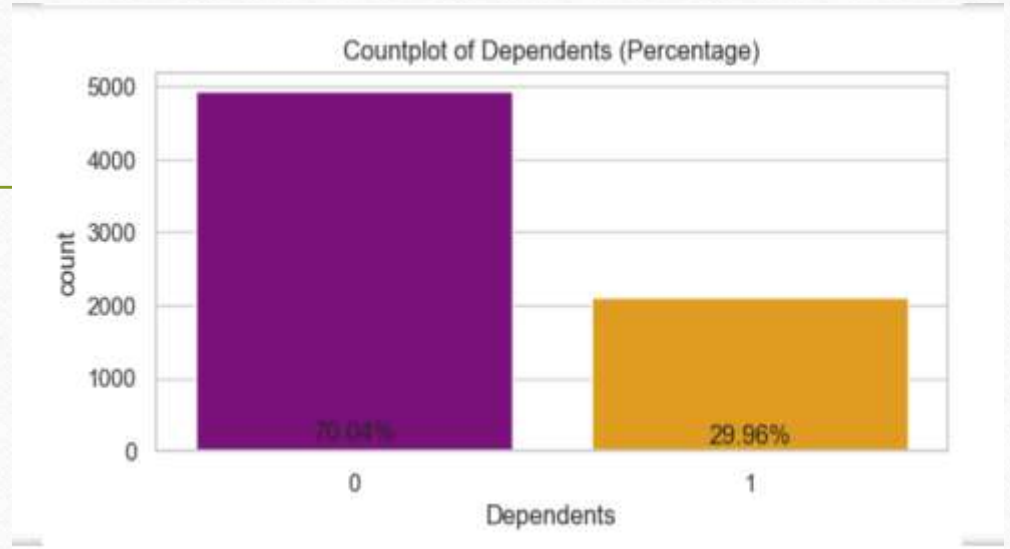


The existing customer base revealed almost a relatively balanced distribution between both genders, with a slightly higher number of male customers.

More customers with senior citizen status churn compared to younger ones. Churn appears to be more common among senior citizens than younger customers.

Categorical Analysis Contd.

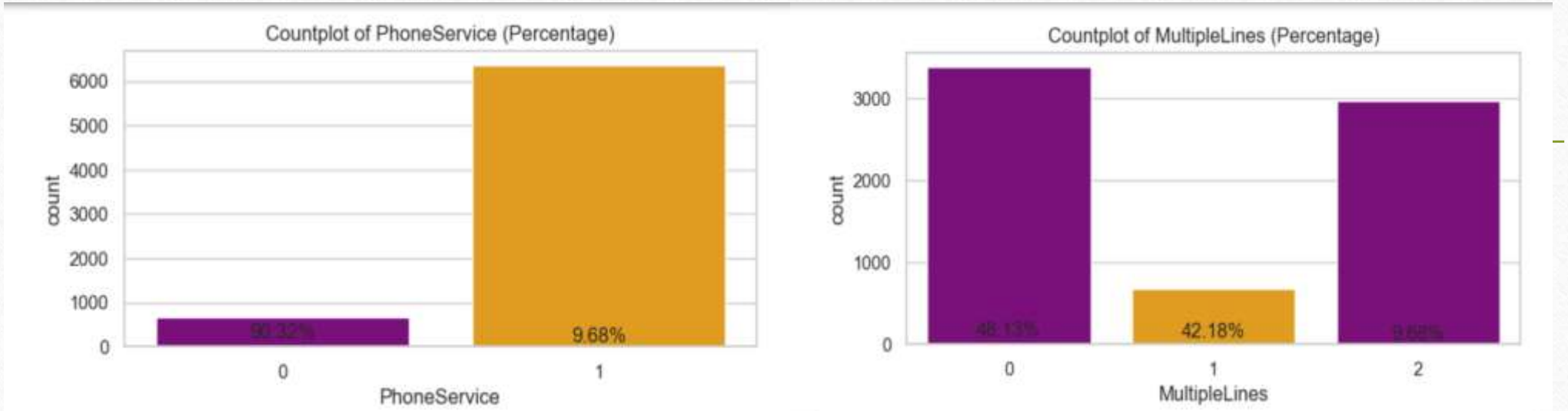




Customers without partners experience nearly twice the churn rate as those with partners. And churn for those with dependents is no less than 70 percent in that customer segment.

Further analysis is essential to understand the factors influencing churn, especially in specific customer segments such as those without partners and dependents.

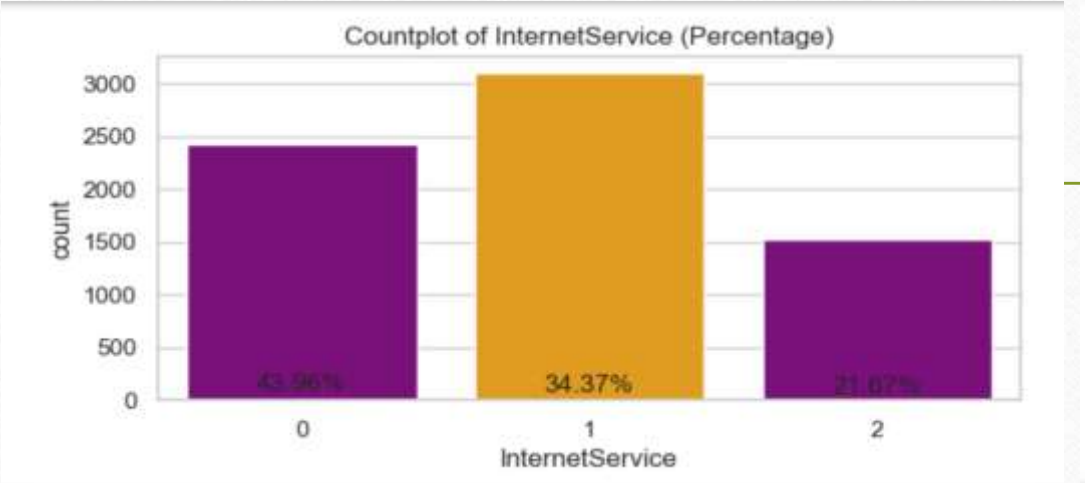
Categorical Analysis Contd.

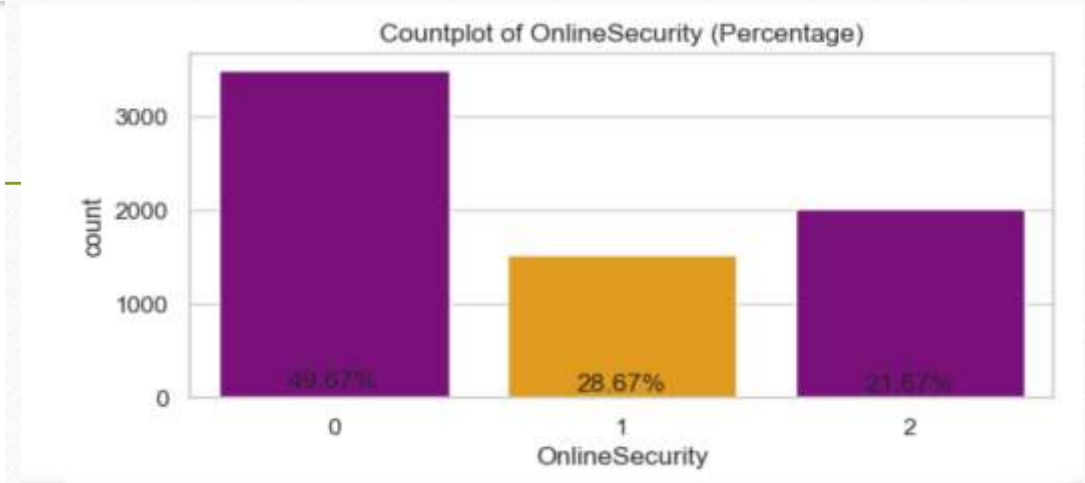


- **Customers with phone service have a slightly higher churn rate compared to those without it.**
- **Further investigation is needed to understand the factors influencing churn in the context of phone service subscriptions.**

- **Customers with no multiple-line service churn more than those with multiple lines or no phone service.**
- **Further exploration is necessary to identify the specific reasons behind the higher churn rates associated with multiple-line subscriptions.**

Categorical Analysis Contd.

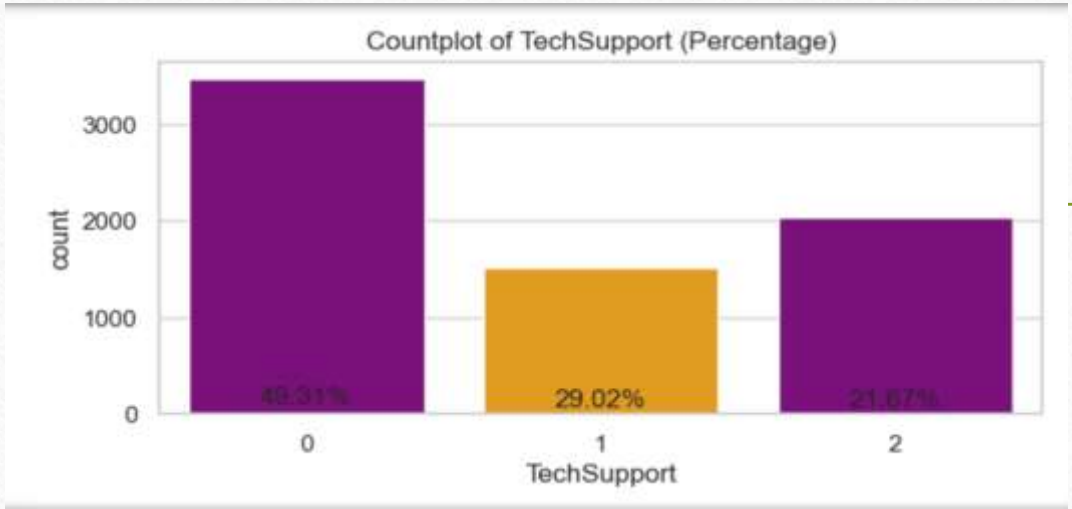


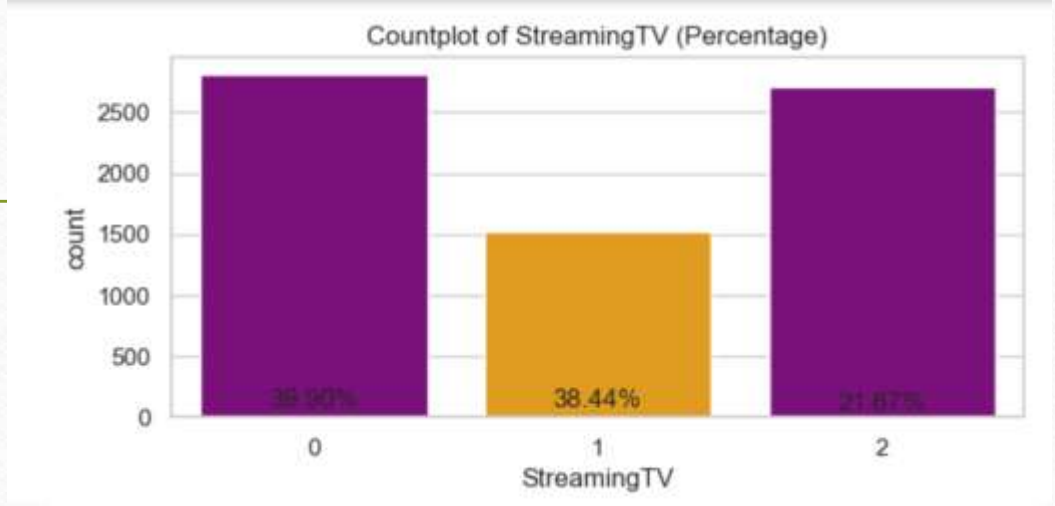


- **It is evident that no fewer than 43.96% churned in being DSL subscribers, 34.37% Fibre Optic, and only 21.67% churned among those who are not internet subscribers**

- **49.67% of customers without online security experienced churn, and 28.67% with online security service also churned, while only 21.67% of customers without internet service churned.**

Categorical Analysis Contd.

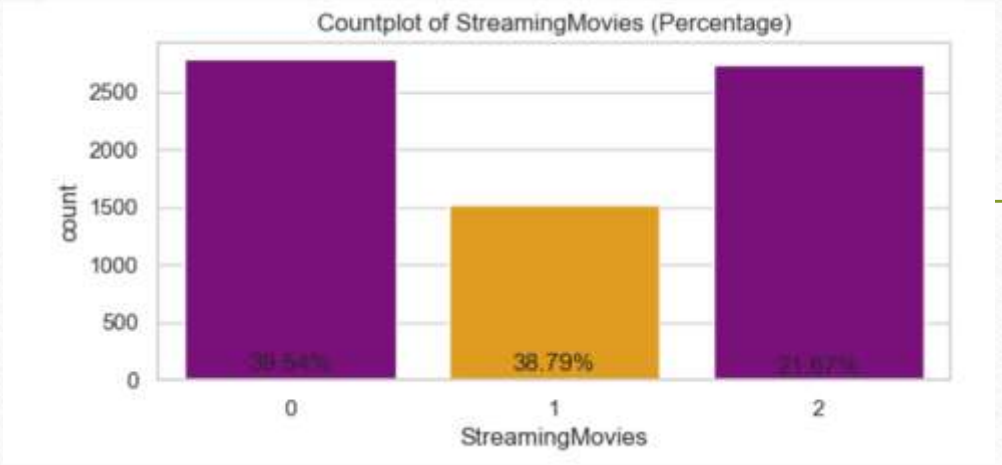


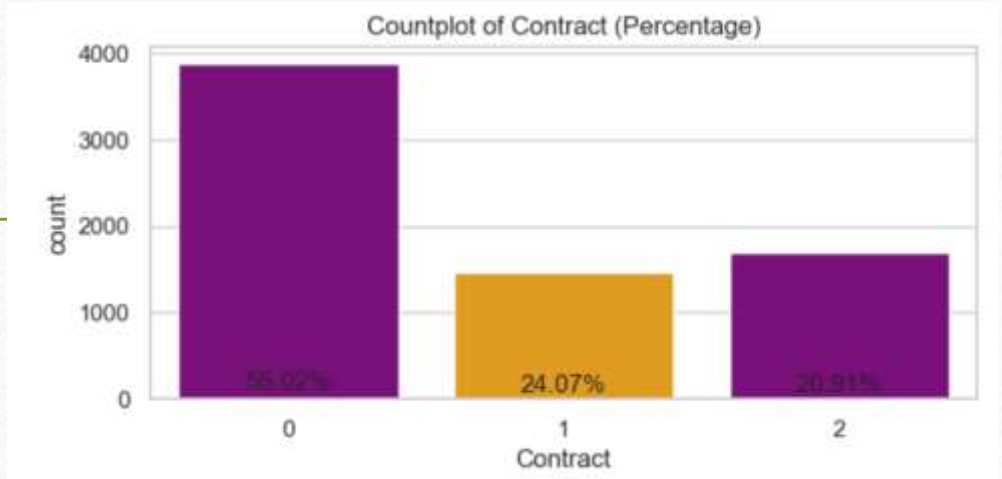


- **The churning rate for customers without Tech Support is comparatively higher than those with Tech Support and those without internet service, i.e., 49.31%, 29.02%, and 21.67%, respectively.**

- **Those without Streaming TV are churning almost equally to the number of those with the streaming service, while only 21.67% represent those churning among those with no internet service.**

Categorical Analysis Contd.



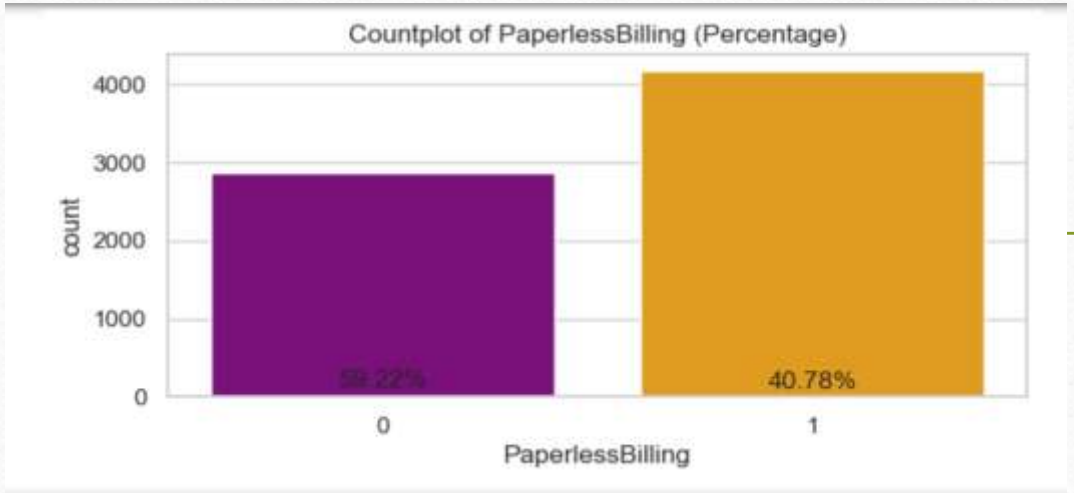


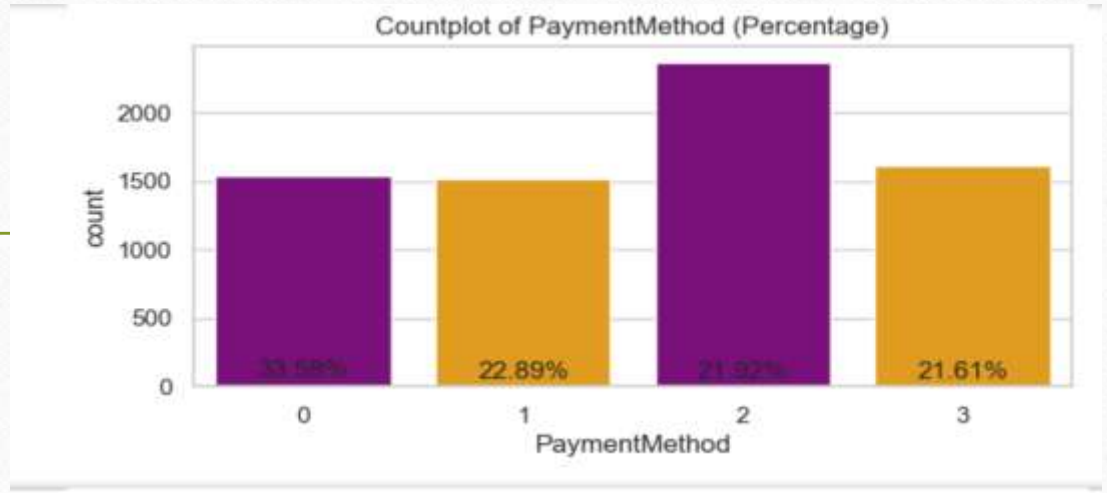
Customers without Streaming movies are churning almost equally to the number of those with the streaming service, while only 21.67% represent those churning among those with no internet service

• The highest rate of churning is observed among customers with month-to-month contracts, representing slightly more than half of the churning in this customer subcategory.

• Whereas no less than 24.07% churning is observed among customers with 1-year contracts. The least, 20.91% churning is observed among two-year contract customers.

Categorical Analysis Contd.





- **Customers who subscribe to paperless billing have a higher percentage of churning (59.22%) than those who do not subscribe to this billing method.**

- **Observably, 33.58% of customers using electronic checks for payment experienced churn.**

- **Also, 22.89% of customers using mailed checks for payment experienced churn.**

- **While 21.92% of customers using automatic bank transfer for payment experienced churn.**
- **And 21.61% churning was observed among customers using automatic credit cards for payment.**

Model Performance

Logistic Regression:

Accuracy: 81.26%
Precision: 66.77%
Recall: 58.18%
F1-score: 62.18%
AUC-ROC: 73.88%

Random Forest:

Accuracy: 79.63%
Precision: 66.55%
Recall: 49.6%
F1-score: 55.33%
AUC-ROC: 70.31%

Decision Tree Classifier:

Accuracy: 72.06%
Precision: 48.14%
Recall: 48.53%
F1-score: 47.68%
AUC-ROC: 64.85%

Model Adoption

LOGISTIC REGRESSION

The Logistic Regression model outperforms both Random Forest and Decision Tree models in terms of accuracy, precision, recall, F1-score, and AUC-ROC.

RANDOM FOREST

Random Forest has a competitive performance but falls behind Logistic Regression in the recall.

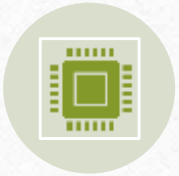
DECISION TREE

Decision Tree shows the lowest performance across all metrics.

******Based on the given metrics, the Logistic Regression model was deployed for predicting churning for Connecttel Limited.******

Conclusion

- The analysis of features indicates that numerical features play a significant role as primary influencers of the level of churn.
- This implies that the inclusion of additional numerical features has the potential to enhance the predictive capabilities of the model.
- The exploration and integration of relevant numerical features may result in a more resilient and accurate model.



After reviewing, the Logistic Regression Model, I identified key factors influencing churn, such as Total Charges, Month-to-month contracts, Fiber optic internet service, and lack of online security. On the flip side, indicators of customers not churning include Tenure Years, Two-year contracts, DSL Internet service, and no Multiple lines.

It's vital to maintain ongoing model monitoring. Continuous updates with new data, exploring feature engineering, and experimenting with parameter tuning are crucial practices for sustained improvement over time.

Thank You !

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