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Predicting Customer Churn: SyriaTel Telecommunications

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Overview

Context

- SyriaTel has a churn rate of 15% in customers who have been with the company for less than 245 days.
- industry retention surveys have shown that the price and product are important, most people leave any servie because of dissatisfaction with the way they are treated".
- telecom industry by the database marketing institute, it was noted that telecom companies have an annual churn rate between 10%-67%.

Business Understanding:

While many variables influence customer churn rate, the leading causes of churn can be attributed to one of “the big three:”Average subscription length, Customer acquisition cost, Customer lifetime value (CLV).SyriaTel is a telecommunications company in Syria. They have been informed that some of their customers have started to churn, discontinue their service. This analysis will determine what features will indicate if a customer will ("soon") discontinue their service.

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Purpose:

This project aims to provide SyriaTel with a model to hepl predict whether a customer will soon churn.

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Descriptive Analysis and Feature importance

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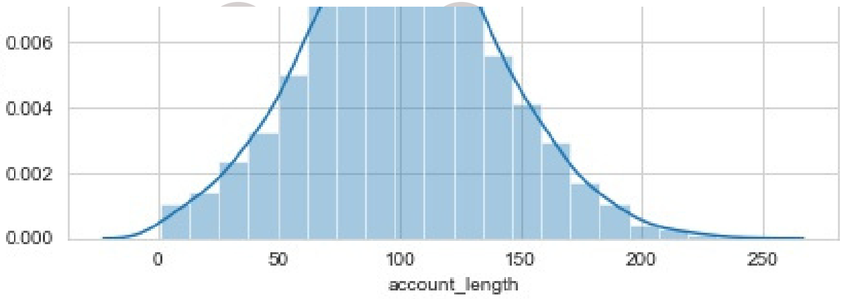
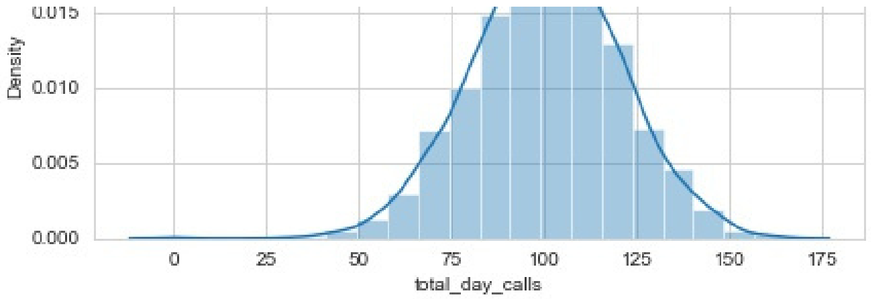
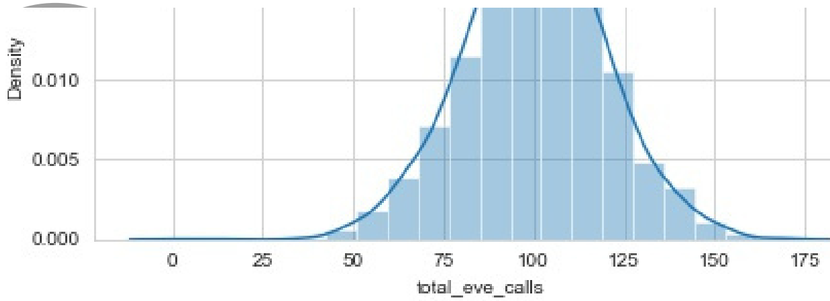
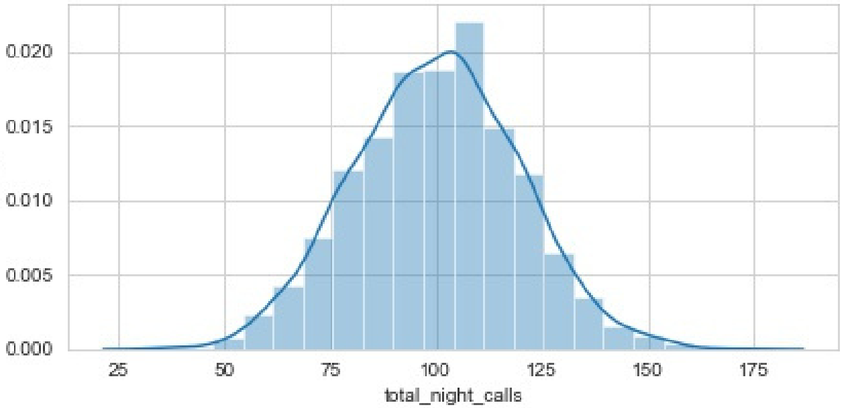
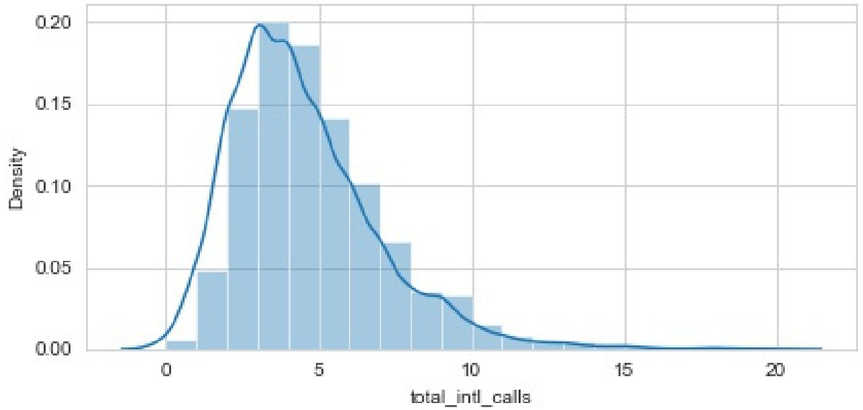
Distribution Plots

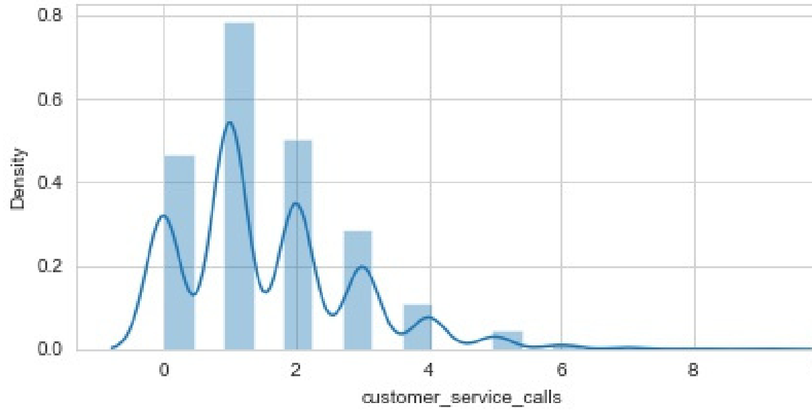






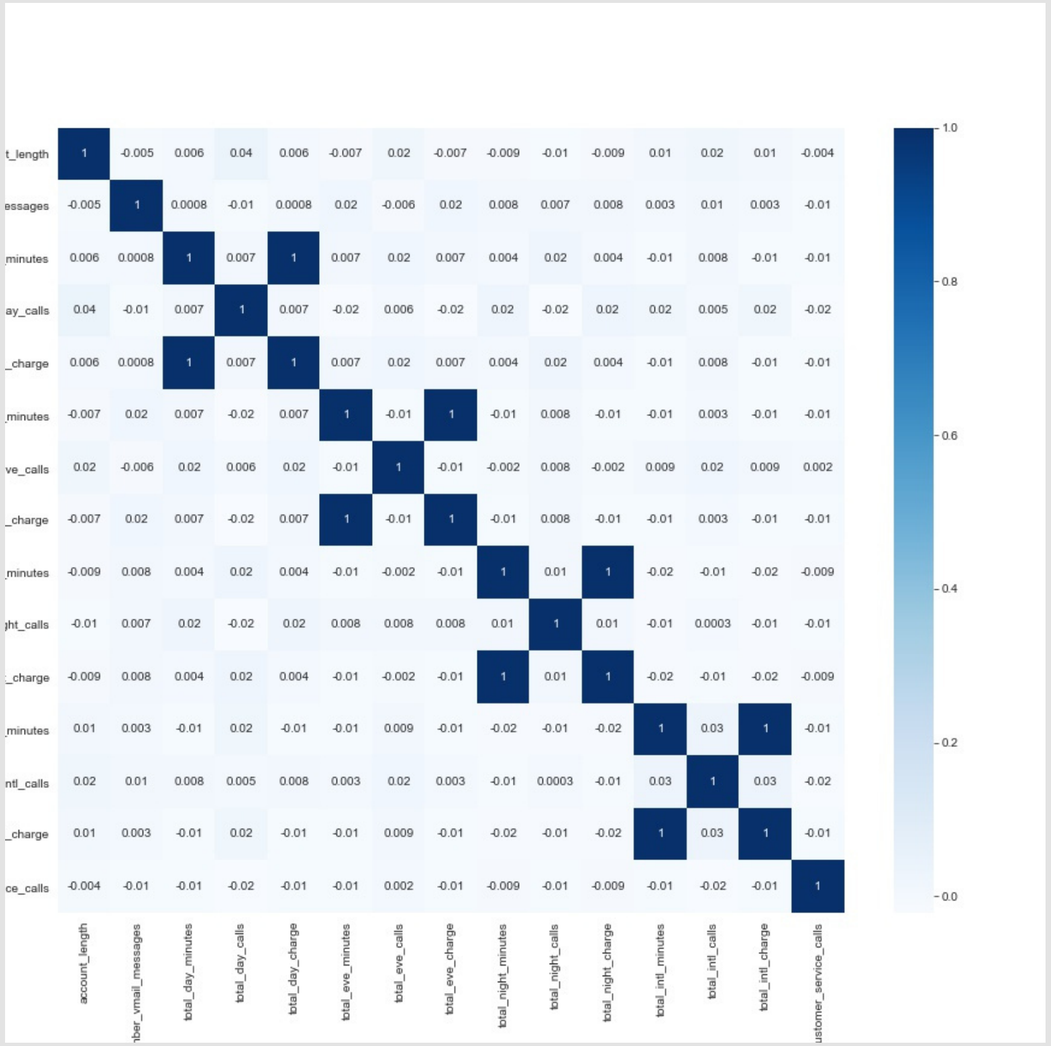






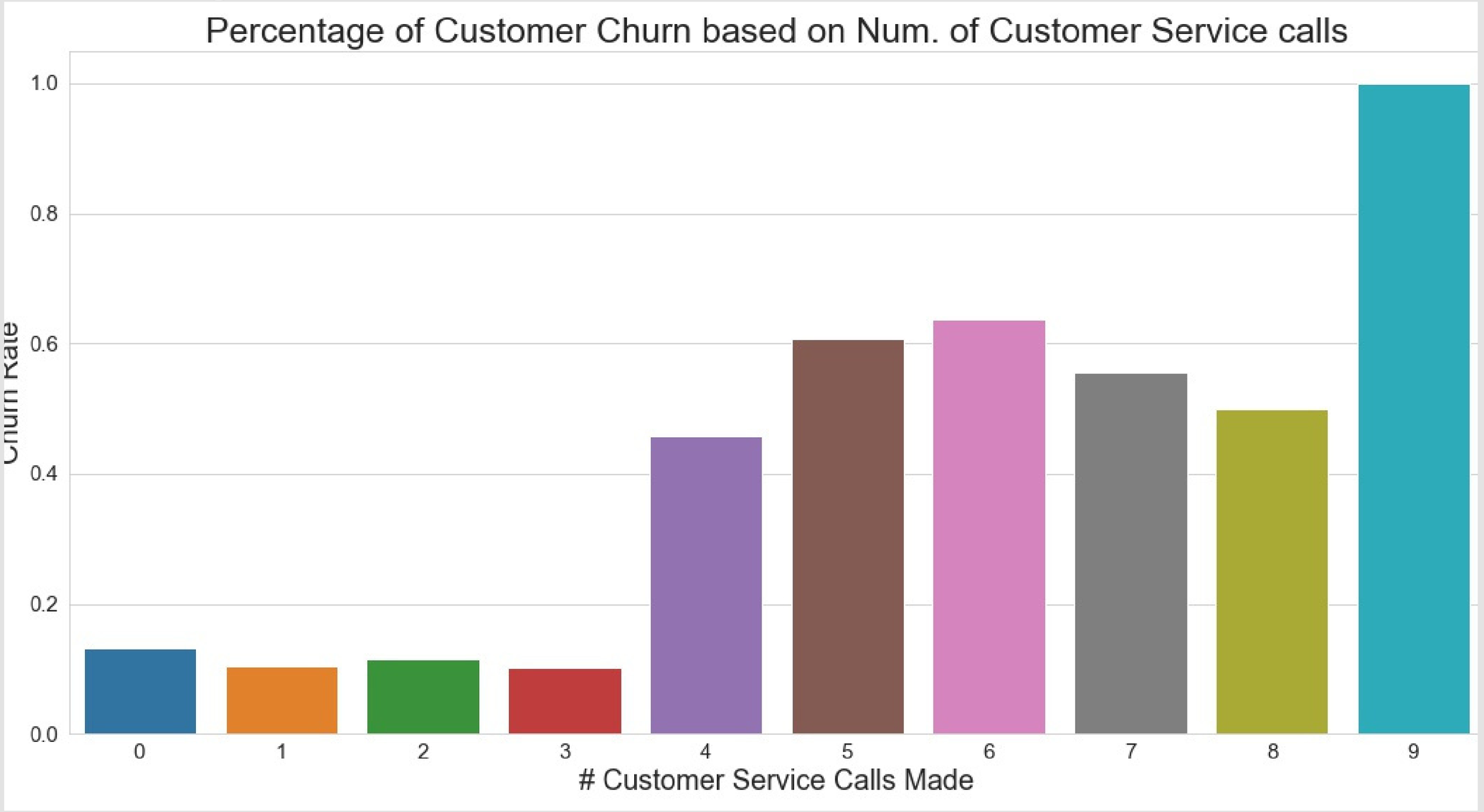
- For the distribution plots of the features above, all of them except customer service calls, have a normal distribution. Total international calls seems to be skewed to the right side however it is still normally distributed.
- Customer service calls has a few peaks, which indicates there are a few modes in the population. This makes sense because customer service calls has to be a integer and not a float number.

Correlation heatmap of numeric Features



- Most of the features are not correlated however some do share a perfect correlation.
  - Total day charge and total day minutes features are fully positively correlated.
  - Total eve charge and total eve minutes features are fully positively correlated.
  - Total night charge and total night minutes features are fully positively correlated.
  - Total int charge and total int minutes features are fully positively correlated.
- It makes sense for these features to be perfectly correlated because the charge is a direct result of the minutes used.
- The perfect correlation of 1 indicates the presence of perfect multicollinearity. It does not have the same impact on nonlinear models as it does on linear models. Some nonlinear models are impacted by perfect multicollinearity whereas others are not.

Percentage of Customer churn based on Customer Service Calls



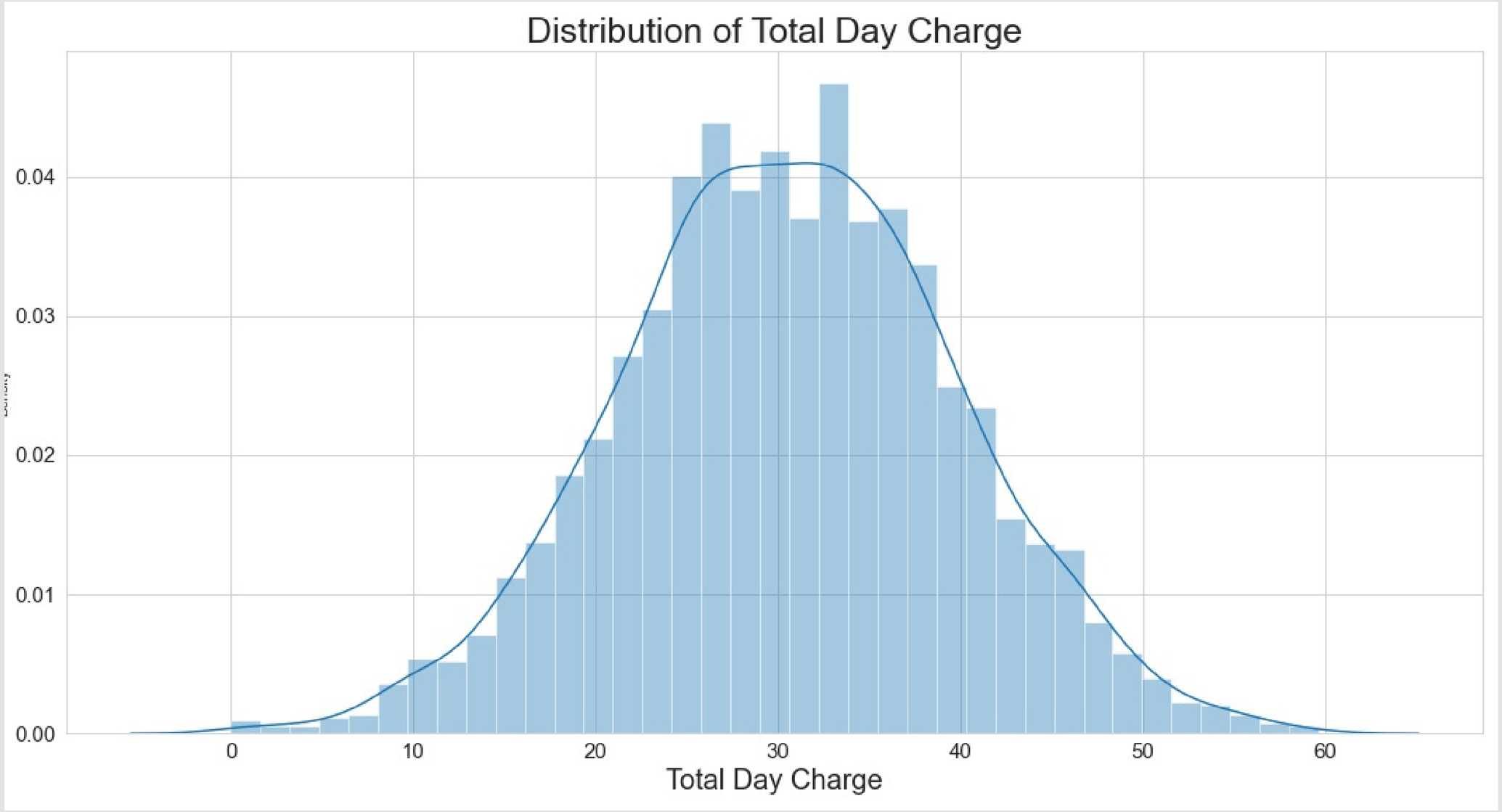
Business Understanding:

While many variables influence customer churn rate, the leading causes of churn can be attributed to one of “the big three:”Average subscription length, Customer acquisition cost, Customer lifetime value (CLV).SyriaTel is a telecommunications company in Syria. They have been informed that some of their customers have started to churn, discontinue their service. This analysis will determine what features will indicate if a customer will ("soon") discontinue their service.

Number of Customer per Area Code

We can see here that customer churn is a consistent rate of roughly 14-15% across all three area codes. Area code 415 has the highest number of customers but still churns the same rate as the other two area codes. For this reason, we choose to drop area code from our dataset.

Number of Customer per Area Code



- This is almost a perfect normal distribution and so we don't detect any unusual activity or outliers for total day charge
- From the analysis above, customers with total day charges of over roughly $55 have a 100% rate of churn. Perhaps the company could investigate ways to incentivise these particular customers to stay with some added value perks.

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Modeling and Feature impotance

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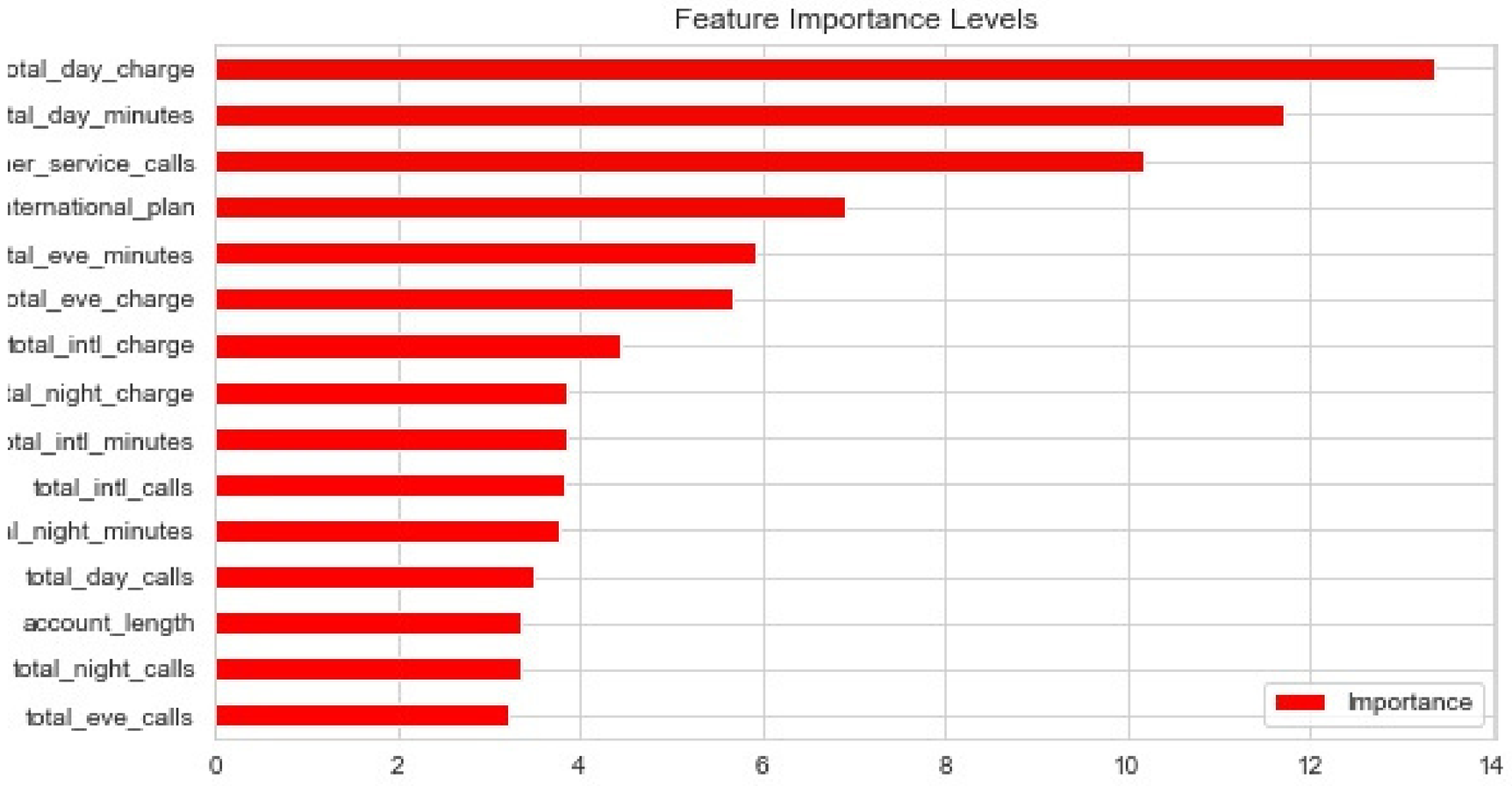
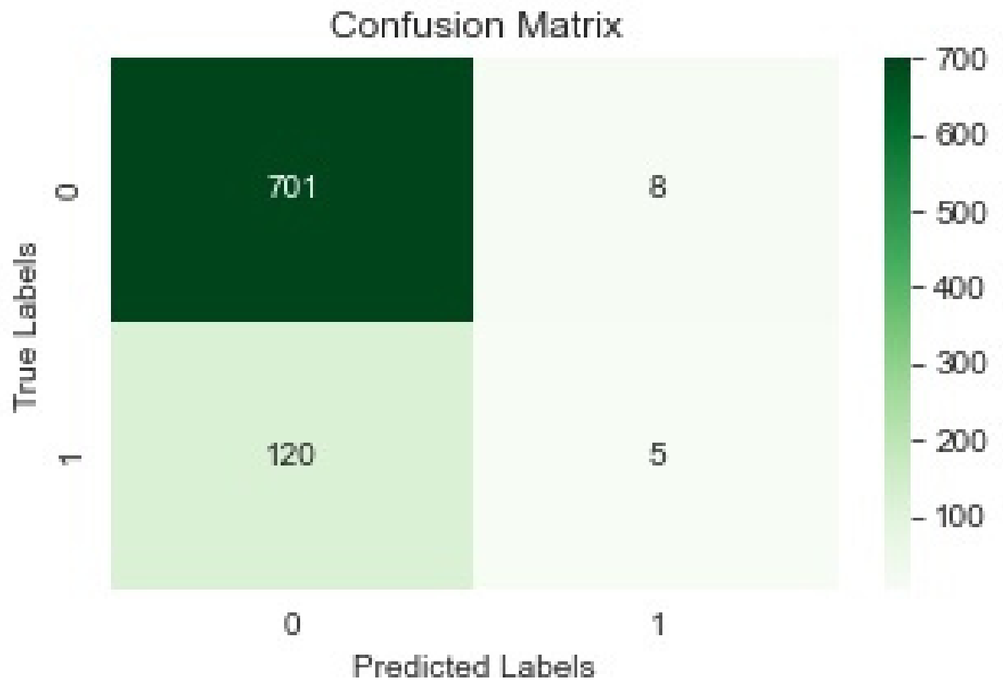
Feature importance

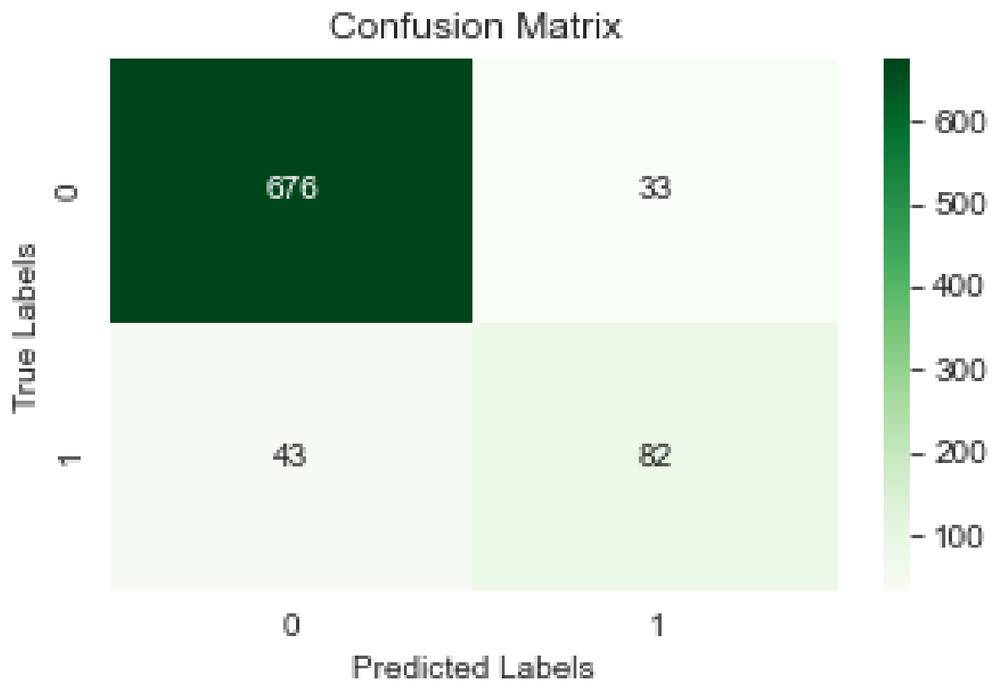


initial model:
Logistic Regression



F1 Score	84.7	
Recall	7.2	
Precision	4	
Accuracy	38.5	
ROC	74.2	

Final model:
Random Forest



F1 Score	65	
Recall	61	
Precision	68	
Accuracy	90	
ROC	94.3	

Model Hyperparameters

- max_depth=20
- min_samples_split=5
- n_estimators=500
- criterion='entropy',
- random_state=42

Contributers to high customer churn based on the Random Forest

- Total day charge
- Total day minutes
- Customer service calls
- International plan

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CONCLUSION

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Conclusion and Further Work

In conclusion, for SyriaTel to get their customer churn to an adequate level, they would need to decrease their customer churn by 7.49% which is 247 customers. If they were to simply focus on the customers who were likely to churn before they were able to by using the classifier, they would be able to predict 75% of potential churns. From their 15% of churns that would happen with no action, they would be able to predict 10% of the customers that would soon churn. If they took action to retain their customers and succeeded with 8 of 10, they would reduce their overall churn by 8%, which would put their churn in an adequate range.

Going forward after improving their business model, customer churn would indicate other undesirable factors from a customer perspective. When customers leave, they are going to the competition. It is unlikely that someone with a high cell phone bill just decides to not have a phone at all. Understanding churn factors will not only allow SyriaTel to understand why their customers are leaving, but also why their customers are leaving for their competitors. Overall, this will lead to the opportunity for SyriaTel to sharpen their attractiveness in the eyes of their customers by competing in the market well.

Recommendations

- Recommendation for Syria Tel

- My recommendation for SyriaTel was to create a flat monthly fee for its users so that they would be more likely to stay with the company. By calculating the average charge per user, I found that it is about $55. For this business model to work for both SyriaTel and their customers, the best solution would be for them to charge a monthly fee to the demographic of customers who are charged $40 or less monthly and a higher tier plan for the users who use their phones more.
- Cost analysis of customer acquisition and retainment
- Investigation into how to better assist customers to reduce the need to call customer service - Investigation into retention efforts for international plan holders (currently 42% churn) - Investigate potential trends in high churn states
- Investigate ways to incentive customers with total day chargers over $55 (currently 100% churn)

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THANKYOU

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