SyriaTel Classification Analysis

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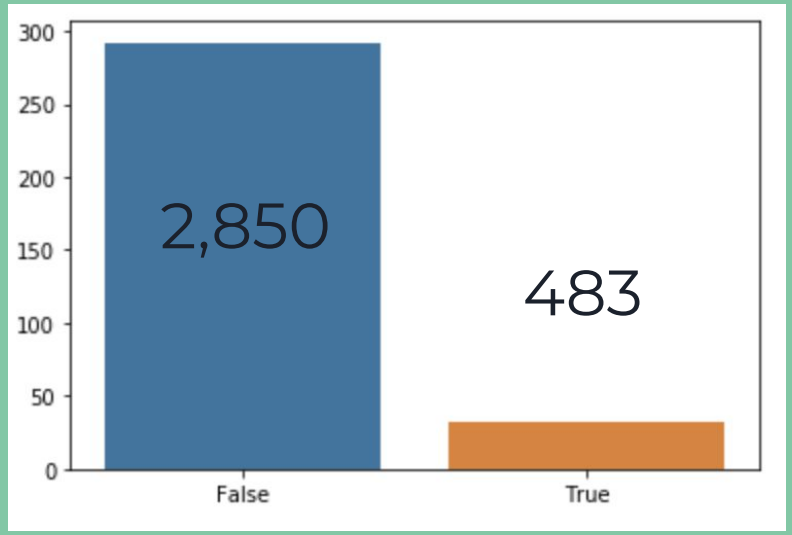
Purpose Analysis:

An analysis has been done to predict whether a customer will ("soon") stop doing business with SyriaTel. Highlighting the features that decide what type of customer is more likely to churn. To give insight in how to reduce the churn rate at SyriaTel.

There are a total of 21 different features including the target variable, churn, providing the information of whether or not a customer has stopped doing business with the company.

3,333 total customers



Churn

14.5%

of customers no longer do business with SyriaTel

$$\frac{\text{Total \# of customer churn}}{\text{Total \# of customers}}$$

Data Collected:

- Total **intl** minutes
- Total **intl** calls
- Total **intl** charge

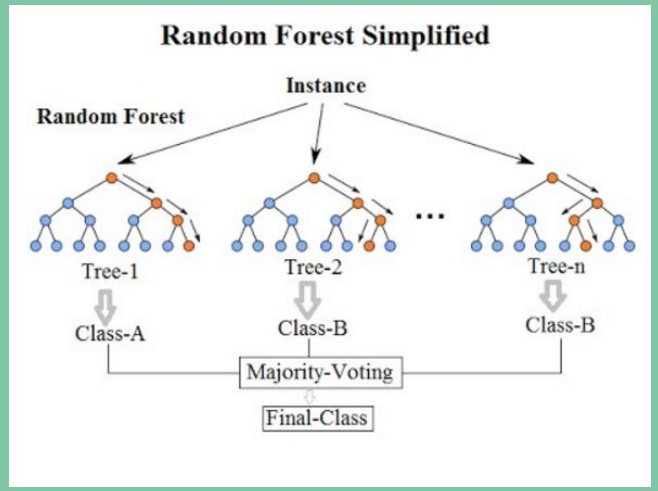
- State
- Account length
- Area code
- Phone number
- International plan
- Voicemail plan
- Number vmail messages
- Customer service calls
- **CHURN**

- Total **day** minutes
- Total **day** calls
- Total **day** charge

- Total **eve** minutes
- Total **eve** calls
- Total **eve** charge

- Total **night** minutes
- Total **night** calls
- Total **night** charge

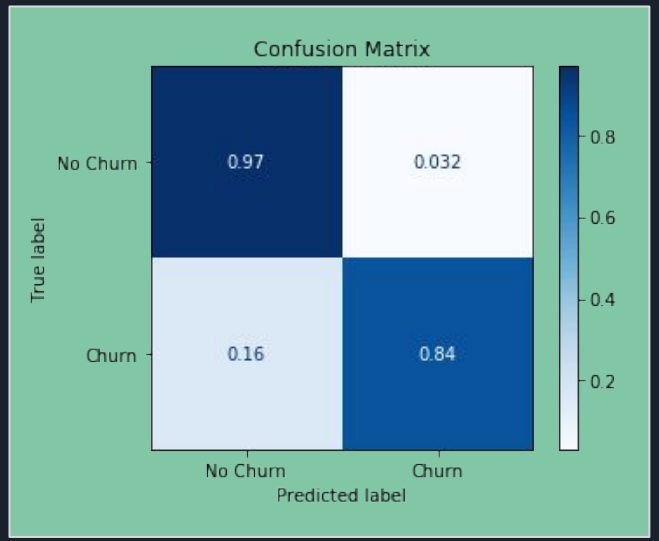
Methods :

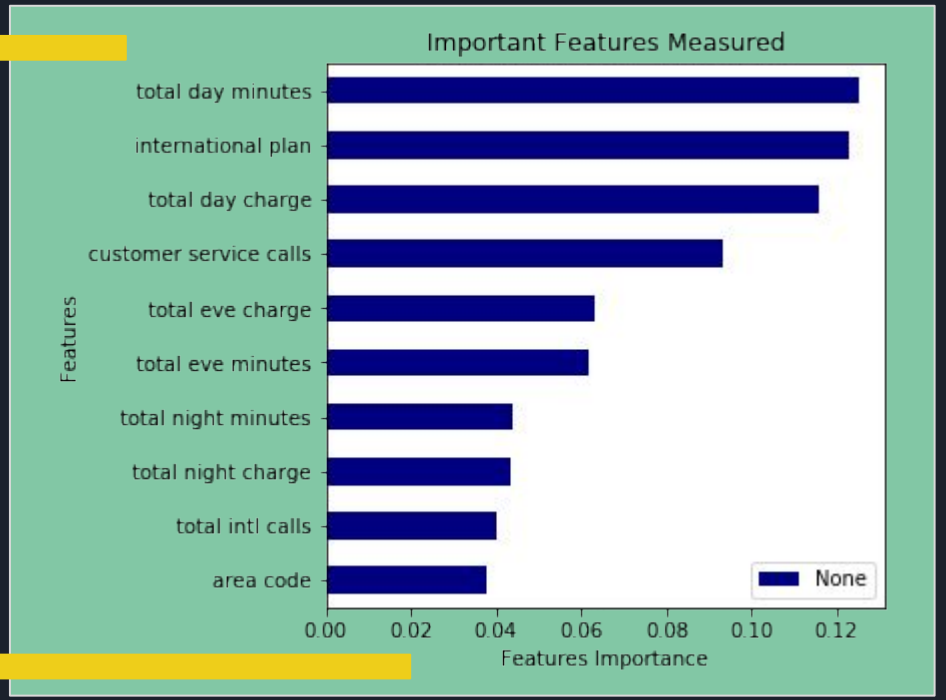


Random Forest is an algorithm that consist of many decision trees using random subsets of features that averages the outcome to make predictions.

RandomizedSearchCV is an algorithm that takes the input of parameters and attempts every combination and outputs the best hyper parameters for the model.

Random Forest - tuned model





Insight and Recommendations

1. Customers who use more minutes during the day and get charged are more likely to stop doing business.
    a. lowering total day charge.

2. Customers that have a voice mail set up are more likely to continue business.
    a. Assist customers with setting up a voicemail.

3. Customers who have an international plan are more likely to discontinue doing business.

Future Work:

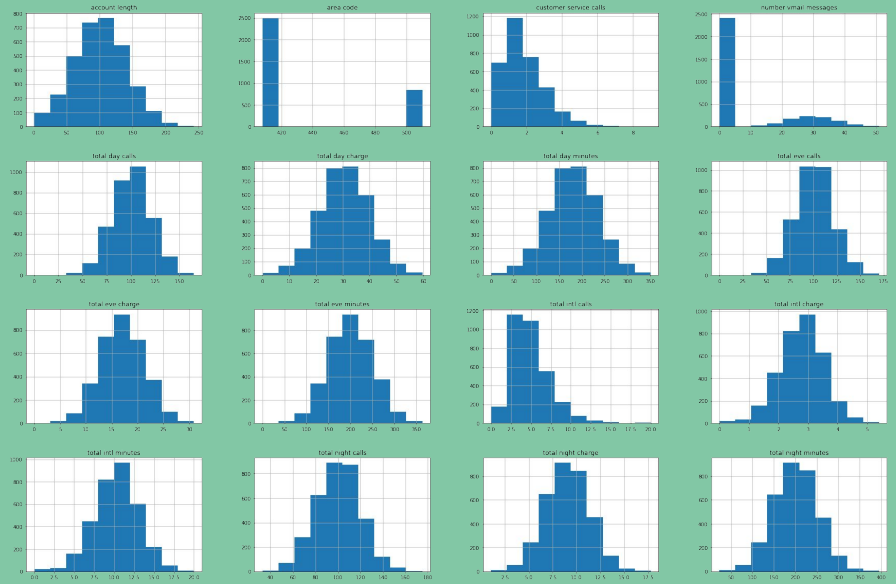
- Fit the data to Gradient Boosting and compare different models.
- Create more vibrant visuals to help analyze data.
- Compare GridSearchCV with RandomizedSearchCV

Thank you!

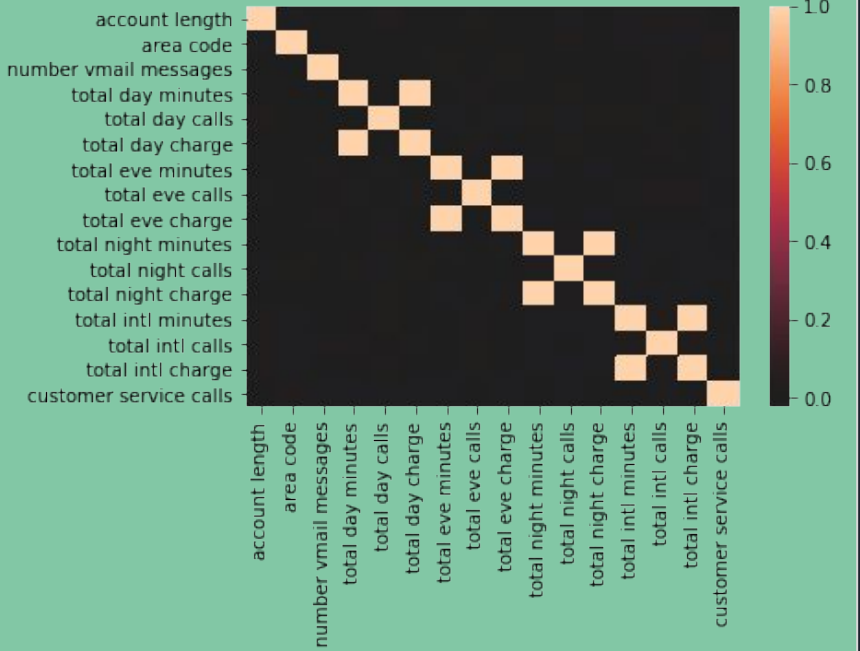
Appendix

- Normal distribution histograms
- Correlation matrix
- ROC curve graph
- Base model Confusion Matrix
- Base model Important Features Bar Graph

Normal distribution



Correlation



test score : **0.936**

N_estimators: 100
- # of trees

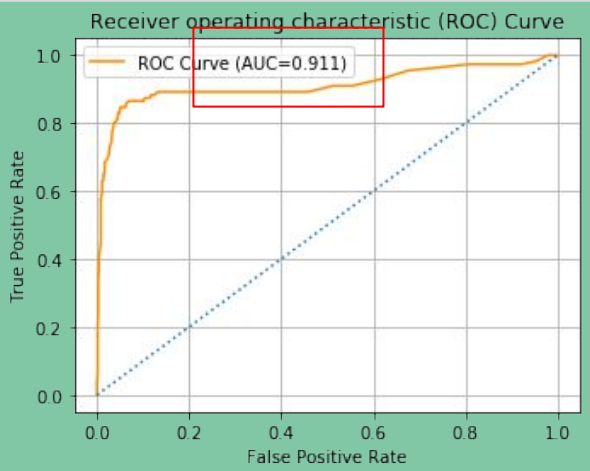
Min_samples_split: 2
- Min required to be a internal node.

Min_samples_leaf: 1
- Min required to be a leaf node.

Max_features: auto
- # features to consider

Max_depth: None

Criterion: gini
- calculates impurity



Base Model

test score : **0.952**

N_estimators: 1000
- # of trees

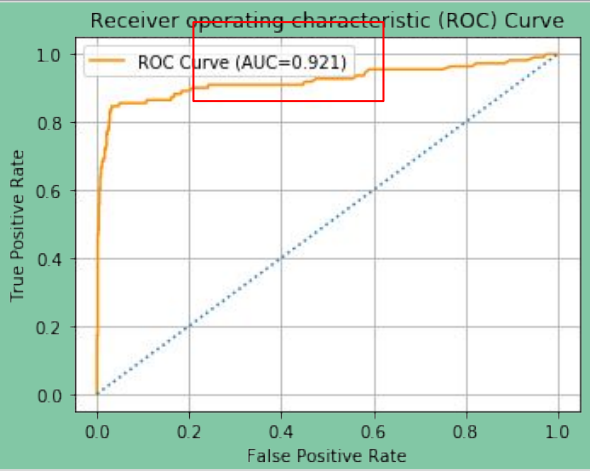
Min_samples_split: 2
- Min required to be a internal node.

Min_samples_leaf: 1
- Min required to be a leaf node.

Max_features: auto
- # features to consider

Max_depth: None

Criterion: entropy
- calculates information gain



Tuned Model

Random Forest - base model