Predicting SyriaTel Customer Churn

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Overview

The goal of this notebook is to predict when a customer will stop continuing their service with SyriaTel.

- Discover which features useful for prediction
- This is a classification problem, various machine learning algorithms employed

Outline

- Business Problem
- Data
- Methods Used
- Conclusions
- Recommendations
- Next Steps

Business Problem

SyriaTel is a Mobile Network Provider currently researching how to improve its services.

SyriaTel wants to know the answer to why customers may stop doing business with them.

Data

Using data which details customer base

3333 samples in total

Methods Used

- Undersampled our target values
- Performed a Training/Test split
- Feature Selection
- Scaled our data
- Ran Machine Learning algorithms against our data to see how we can predict data
    - Vanilla
    - Parameter Tuning

Conclusions

Conlcusions

Features:

`number vmail messages`, **`total day minutes`**, `total day calls`,

`total eve calls`, `total night calls`, `total intl minutes`, `total intl calls`,

`customer service calls`, **`international plan_yes`**, `voice mail plan_yes’

Conclusions

Overall, most models perform similarly, but only one must be selected.

The best model turns out to be the Tuned Support Vector Machine algorithm.

This is because it:

- Consistently has among the highest Precision, Recall, & F1 scores
- Has excellent MAE & RMSE scores.
- Posesses solid ROC curve, with an AUC of 0.89
- Recieved the lowest number of reported False Positive/Negatives on the confusion matrix

Output

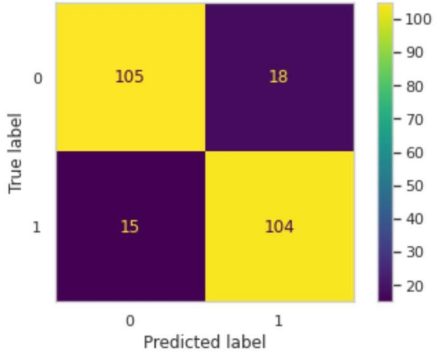
Interpretation of churn with a Tuned SVM:

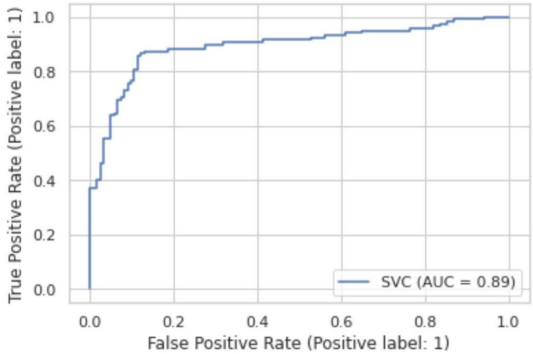
- **105 True Negatives:** Customers continue service with SyriaTel
- **18 False Positives:** The model believes customers will continue service with SyriaTel, but they do not
- **15 False Negatives:** The model believes customers will not continue service with SyriaTel, but they do
- **104 True Positives:** Customers do not continue service with SyriaTel

```
Mean Absolute Error: 0.13636363636363635
Root Mean Squared Error: 0.3692744729379982
```

Out[78]:

	Precision	Recall	F1-score	Support
0	0.875000	0.853659	0.864198	123.000000
1	0.852459	0.873950	0.863071	119.000000
accuracy	0.863636	0.863636	0.863636	0.863636
macro avg	0.863730	0.863804	0.863634	242.000000
weighted avg	0.863916	0.863636	0.863643	242.000000





Recommendations

Usage for our model:

- Predicting if a customer will renew their service with SyriaTel
- SyriaTel can use this model to help determine ways to retain more customers, including altering their phone plan to accommodate highly viable services for maintaining users.
- This model will not help predict the locations of where a user might live or what the area code of their phone number might be (regardless of churn.)

Recommendations

Suggestions:

SyriaTel can benefit from these findings by:

- Offering deals on cell phone minutes & international phone plans.
- Refine the Customer Service experience

SyriaTel can modify this model by:

- Tuning the parameters on the grid search on the this model
- Include fewer features for the model to process
- Use all features from the original dataframe for modeling and see if the Precision, Recall, & F1-scores change.

Next Steps

- Employ a marketing campaign that highlights adjustments to phone plans.
- Ensure existing users directly benefit
    - Existing users will also voice their satisfaction to people

Next Steps

Business is gained, & customers are more satisfied!

Questions?