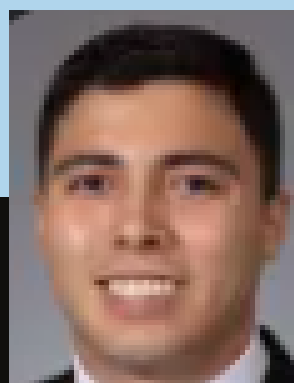


KNOW YOUR CUSTOMER:

SYRIATEL CHURN MODEL

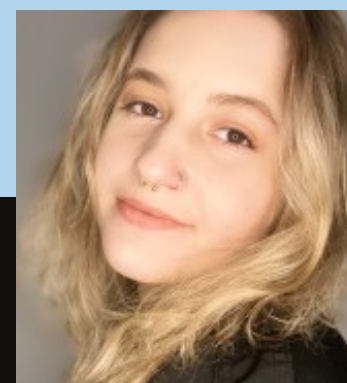


OUR TEAM



David
Johnson

Houston, TX
Your paragraph text



Elina
Rankova

New York, NY
Your paragraph text

CONTENT

01

BUSINESS OBJECTIVES

02

DATA ANALYSIS AND METHODS

03

MODELING

04

RESULTS

05

NEXT STEPS

06

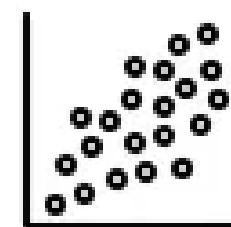
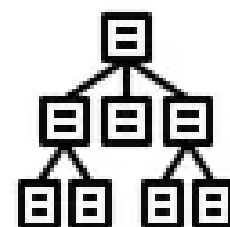
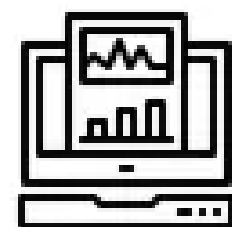
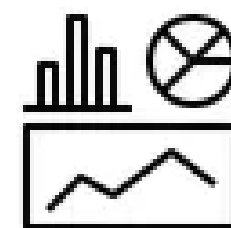
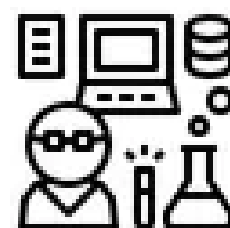
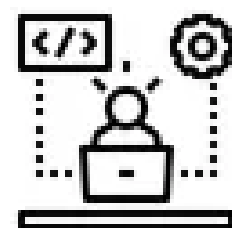
CONTACTS

BUSINESS OBJECTIVE

Build a classifier to predict whether a customer will ("soon") stop doing business with SyriaTel, a telecommunications company.

Measure Performance with Recall:

DATA ANALYSIS



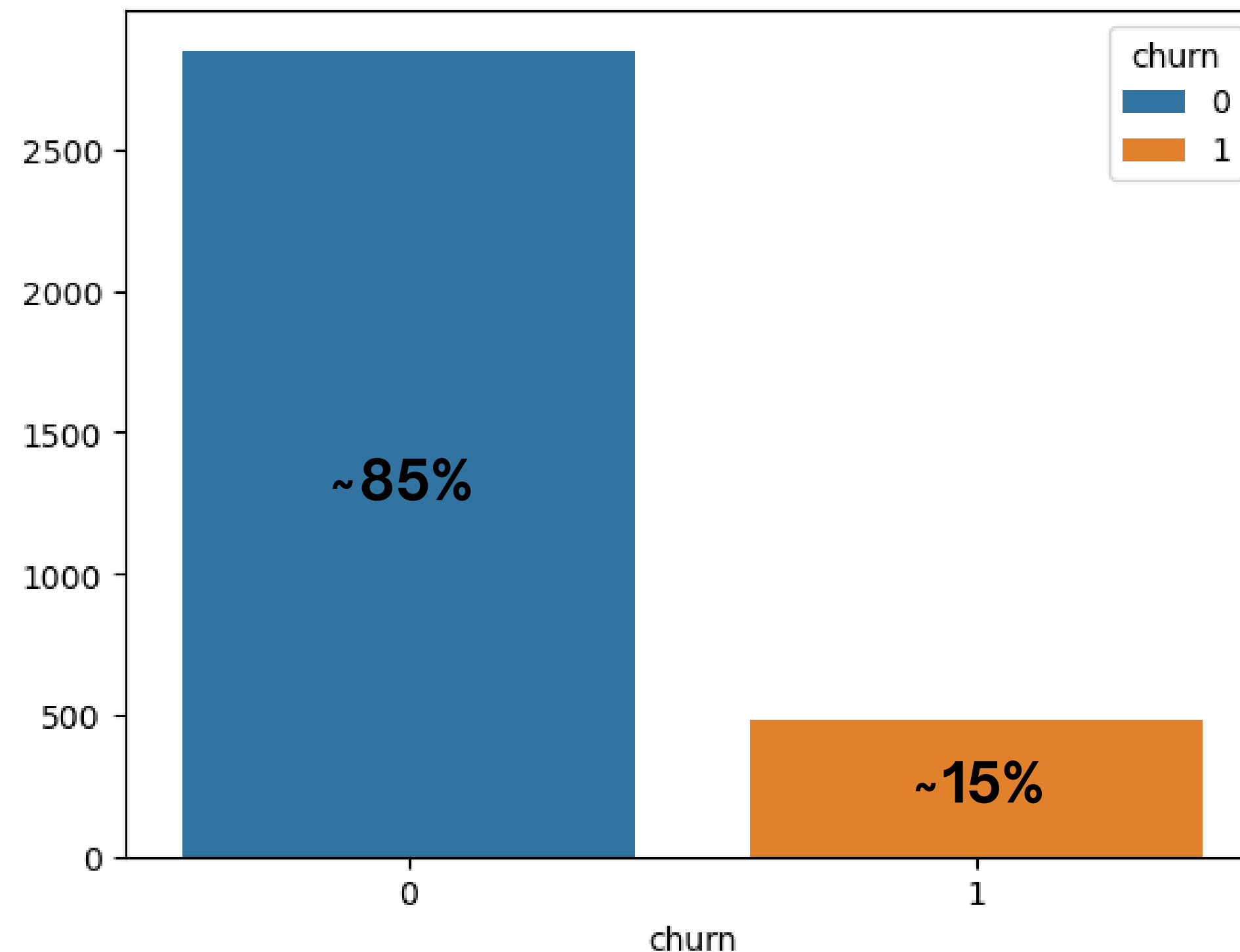
The Data

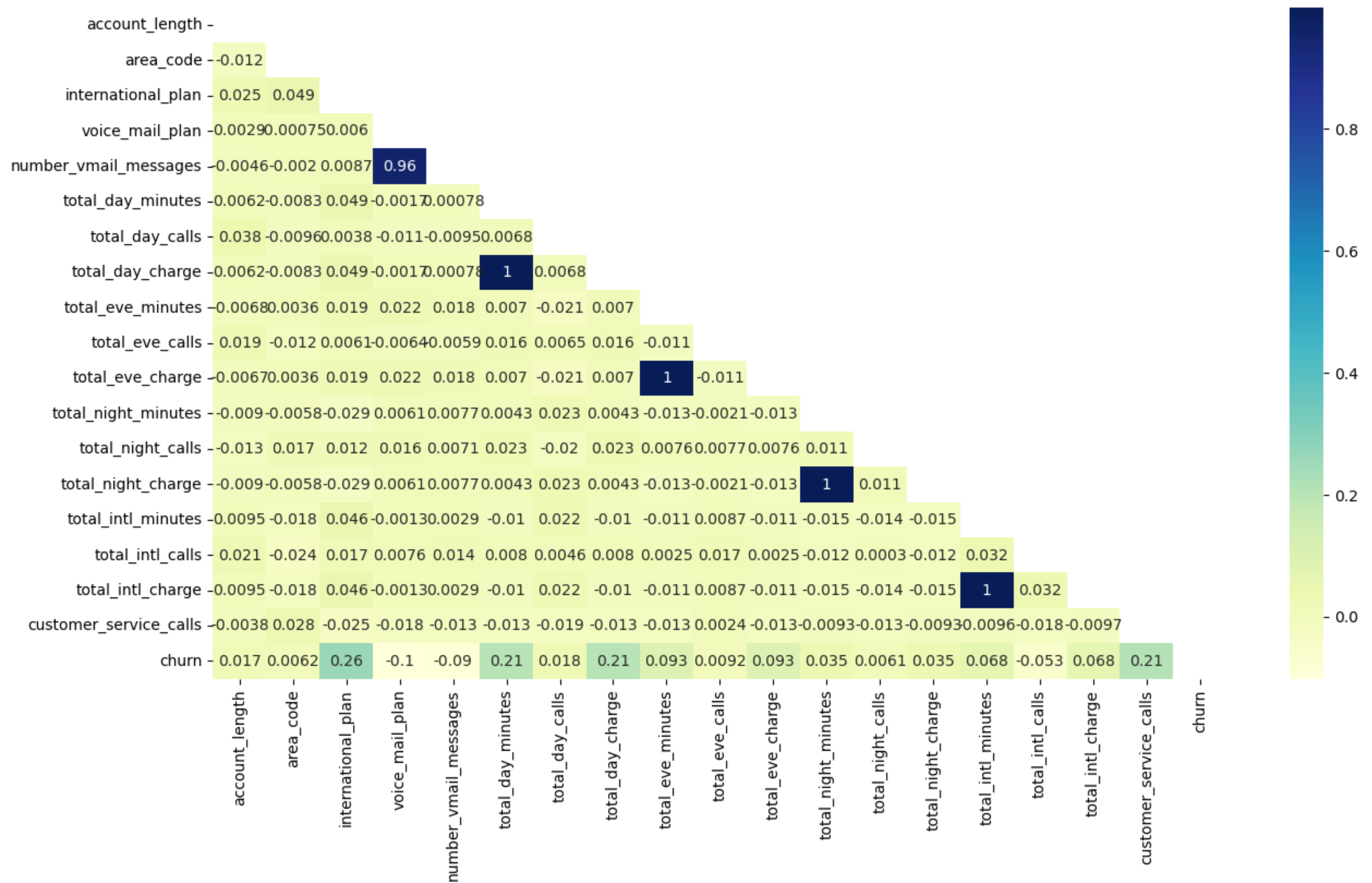
```
<class 'pandas.core.frame.DataFrame'>
```

```
RangeIndex: 3333 entries, 0 to 3332
```

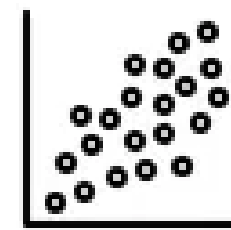
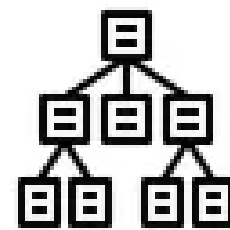
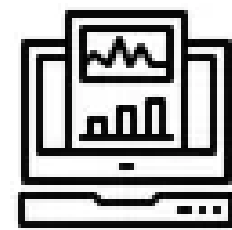
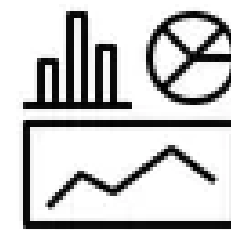
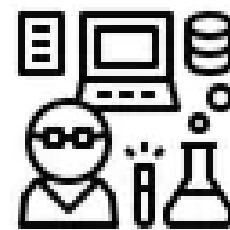
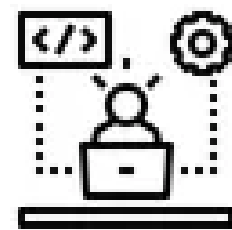
```
Data columns (total 21 columns):
```

#	Column	Non-Null Count	Dtype
0	state	3333 non-null	object
1	account length	3333 non-null	int64
2	area code	3333 non-null	int64
3	phone number	3333 non-null	object
4	international plan	3333 non-null	object
5	voice mail plan	3333 non-null	object
6	number vmail messages	3333 non-null	int64
7	total day minutes	3333 non-null	float64
8	total day calls	3333 non-null	int64
9	total day charge	3333 non-null	float64
10	total eve minutes	3333 non-null	float64
11	total eve calls	3333 non-null	int64
12	total eve charge	3333 non-null	float64
13	total night minutes	3333 non-null	float64
14	total night calls	3333 non-null	int64
15	total night charge	3333 non-null	float64
16	total intl minutes	3333 non-null	float64
17	total intl calls	3333 non-null	int64
18	total intl charge	3333 non-null	float64
19	customer service calls	3333 non-null	int64
20	churn	3333 non-null	bool





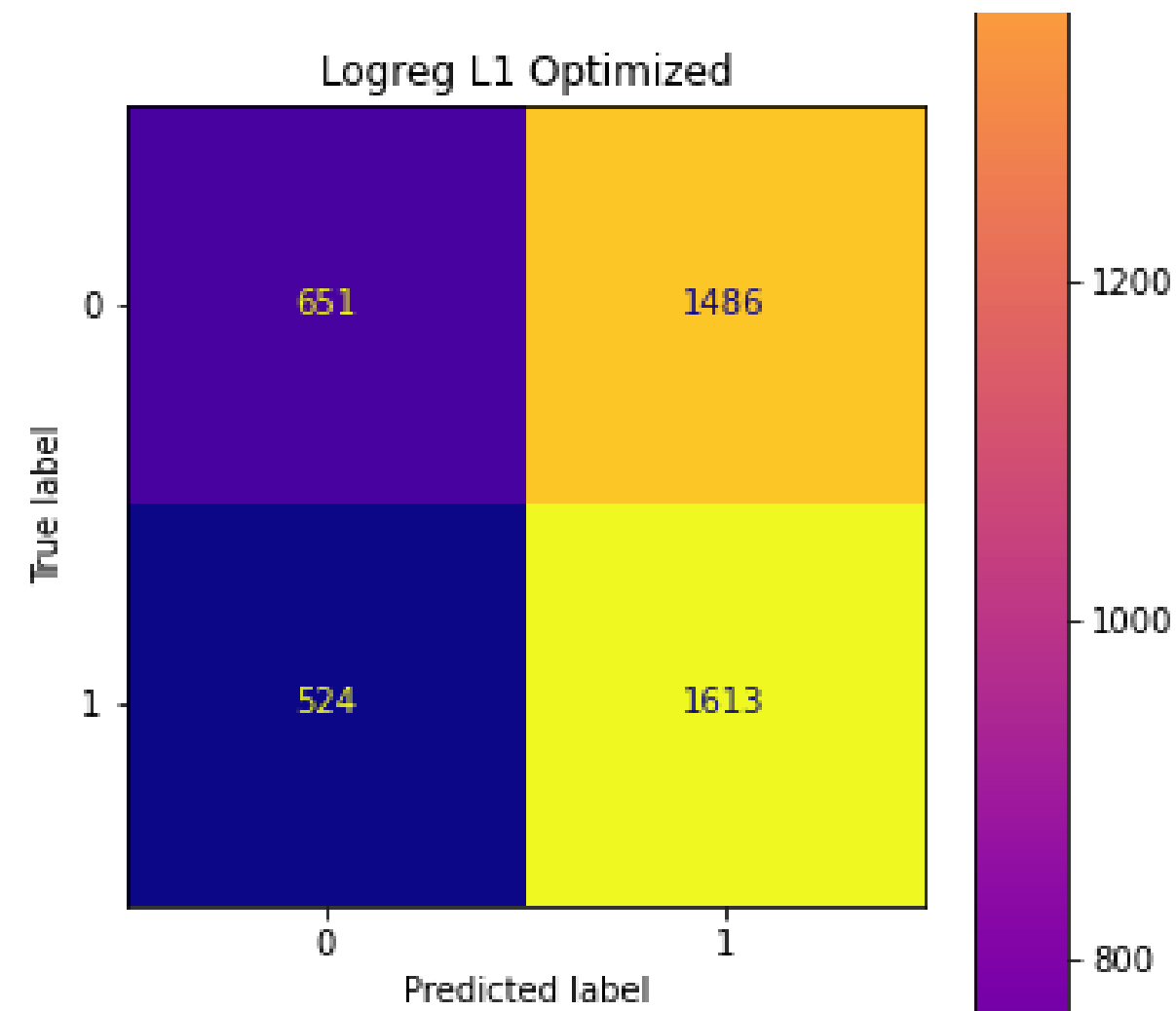
MODELING



Logistic Regression Models

Logistic L1 Model: Data Prep/Train Results

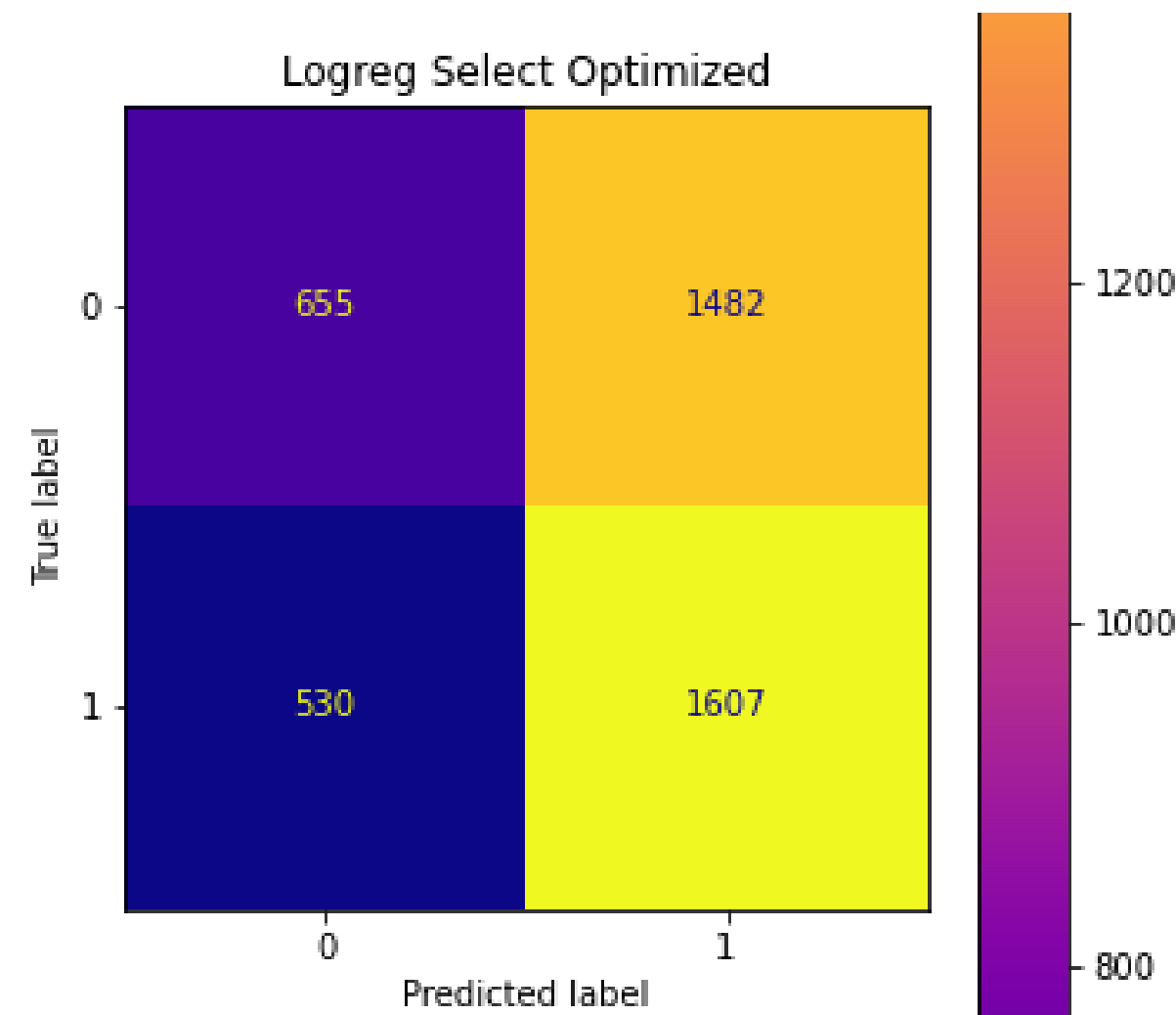
- This model contains **all predictor variables**, except phone number.



Processing steps
SMOTE, hyperparameter tuning,
and OneHotEncoding

Logistic Select Model: Data Prep/Train Results

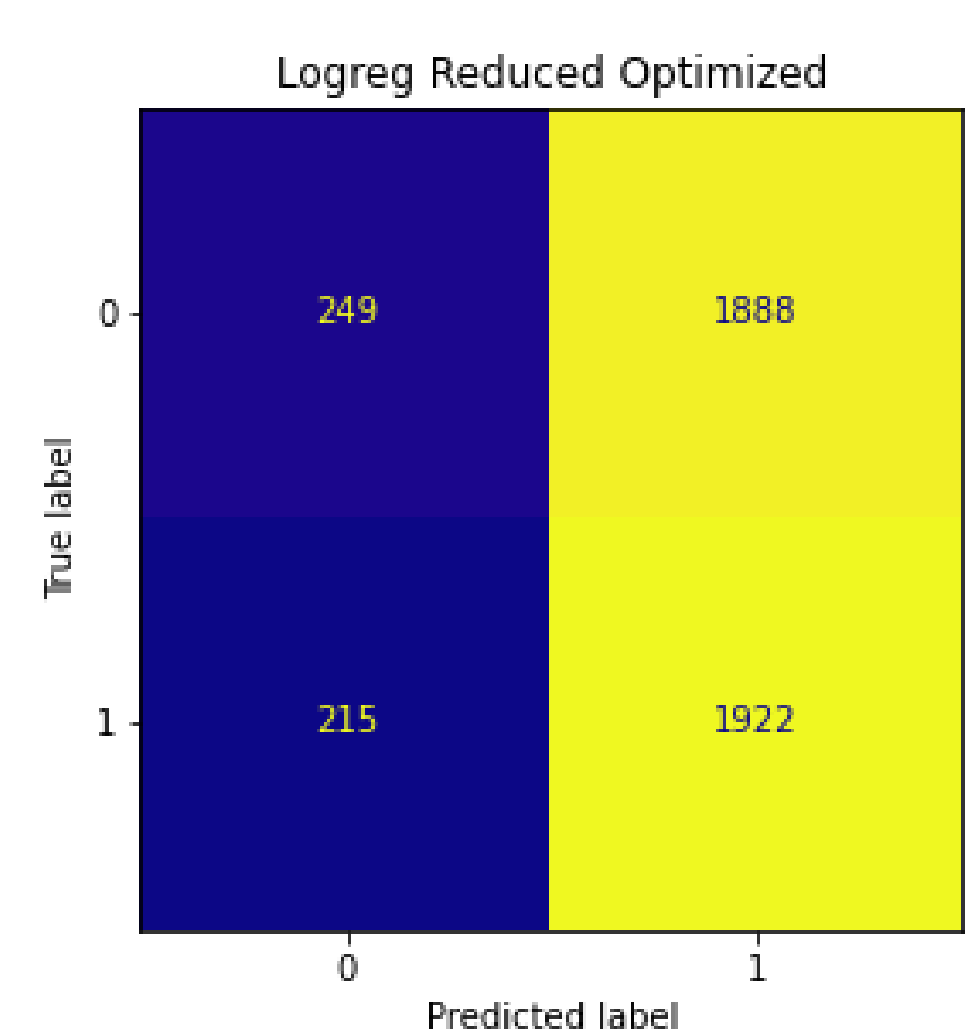
- We Used **SelectFromModel** to select **features** for us that are **most important**:
 - Reduced the dataframe from 69 predictors to 53.



Processing steps
SelectFromModel, hyperparameter
tuning

Logistic Reduced Model: Data Prep/Train Results

- We only included highly correlated predictors with respect to churn.



Processing steps
SMOTE, hyperparameter tuning,
and feature selection

Logistic Regression Models: Test Results

Test Results:

Classification report for Model 1:

	precision	recall	f1-score	support
0	0.91	0.32	0.48	713
1	0.17	0.81	0.28	121
accuracy			0.39	834
macro avg	0.54	0.57	0.38	834
weighted avg	0.80	0.39	0.45	834

Classification report for Model 2:

	precision	recall	f1-score	support
0	0.91	0.33	0.48	713
1	0.17	0.81	0.28	121
accuracy			0.40	834
macro avg	0.54	0.57	0.38	834
weighted avg	0.80	0.40	0.45	834

Classification report for Model 3:

	precision	recall	f1-score	support
0	0.96	0.13	0.24	713
1	0.16	0.97	0.27	121
accuracy			0.26	834
macro avg	0.56	0.55	0.25	834
weighted avg	0.84	0.26	0.24	834

Train Results:

model_name	recall_score
Logistic L1	0.754796
Logistic Select	0.751989
Logistic Reduced	0.899392

Our Logistic
Regression models
are underfitting!!!!

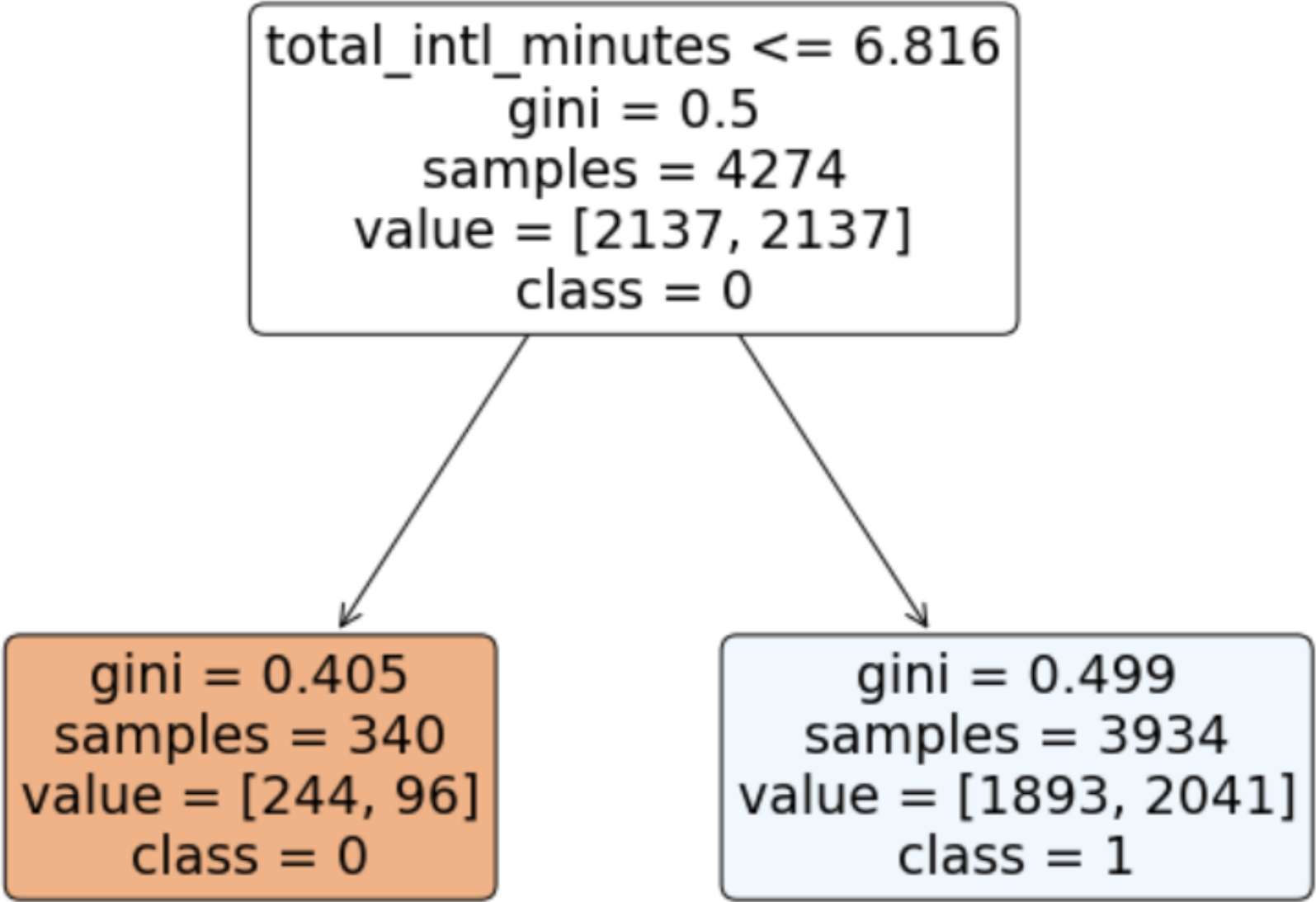
DecisionTree Model

Data Prep/Train Results

- We used the same data that was used for model 3.
- Applied GridSearchCV() to find the optimal parameters for the model.
- Best Parameters:
{'criterion': 'gini',
'max_depth': 1,
'max_features': 1,
'min_samples_leaf': 1,
'min_samples_split': 2,
'splitter': 'best'}

CV Train Results

	Metrics	Values
	Mean Train Score	0.946065
	Train Standard Deviation Score	0.022619
	Mean Test Score	0.940583
	Test Standard Deviation Score	0.027754



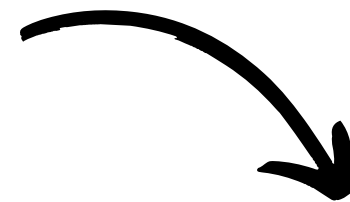
Test Results

	precision	recall	f1-score	support
0	0.89	0.12	0.21	713
1	0.15	0.92	0.26	121
accuracy			0.23	834
macro avg	0.52	0.52	0.23	834
weighted avg	0.78	0.23	0.21	834

FUTURE CONSIDERATIONS

Different type of
model or ensemble
modeling

STEP 1

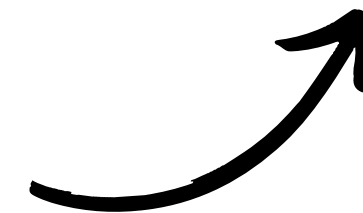


STEP 2

Larger data set to
offset the
underfitting we
encountered

Tiered Marketing
Strategy

STEP 3



Contact

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- Elina Rankova: elinarankova@gmail.com