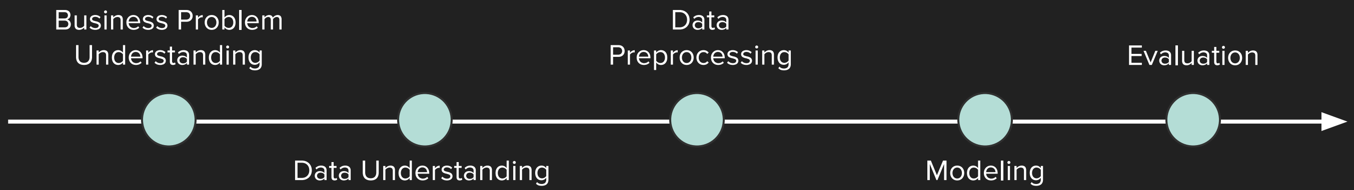
PREVENTING CHURN,

Keeping Customers Happy



Data Understanding

Telecom Dataset from Kaggle

kaggle

3333 customers from all 50 states

Length, frequency, & cost of calls, subscription to international plan, voicemail plan

CHURN

5 to 25 more expensive to acquire new customers, compared to retaining current customers

Increasing retention rates by 5% can increase ***profit rates by 25-95%***

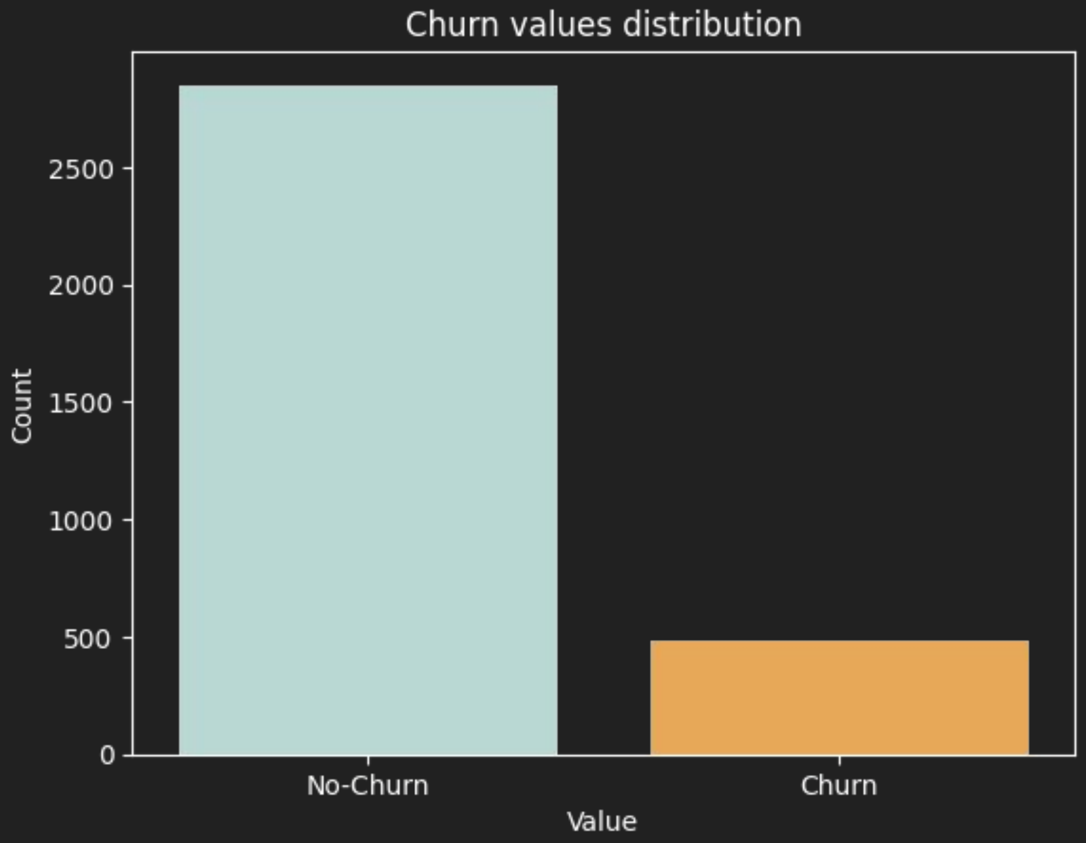
86%

of data is no-churn customers

14%

of the data is churn customers

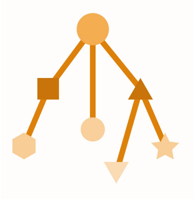
SMOTE (Synthetic Minority Over-sampling Technique)



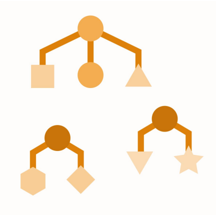
MODELING

Logistic regression

Decision tree



Random forest

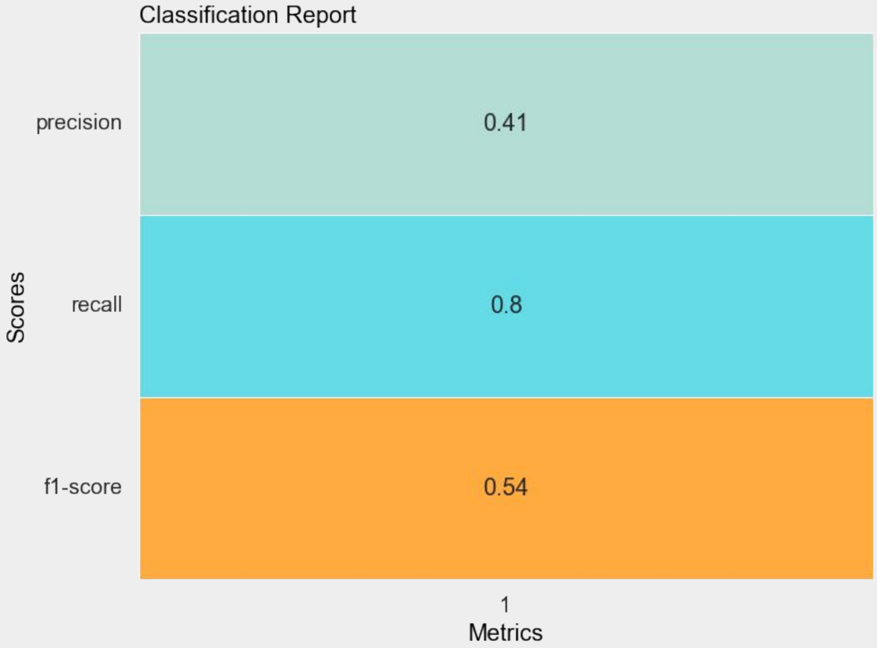


EVALUATION METRICS

RECALL *PRECISION* *F1 SCORE* *ROC-AUC*

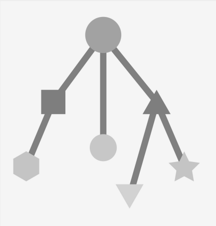
Logistic Regression

RAW SCORES



FINAL SCORES

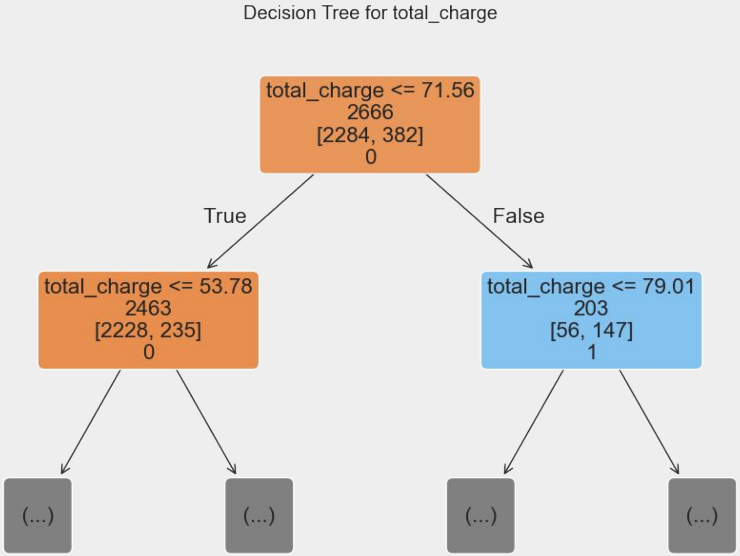
(Cross-validated, hyper-tuned)

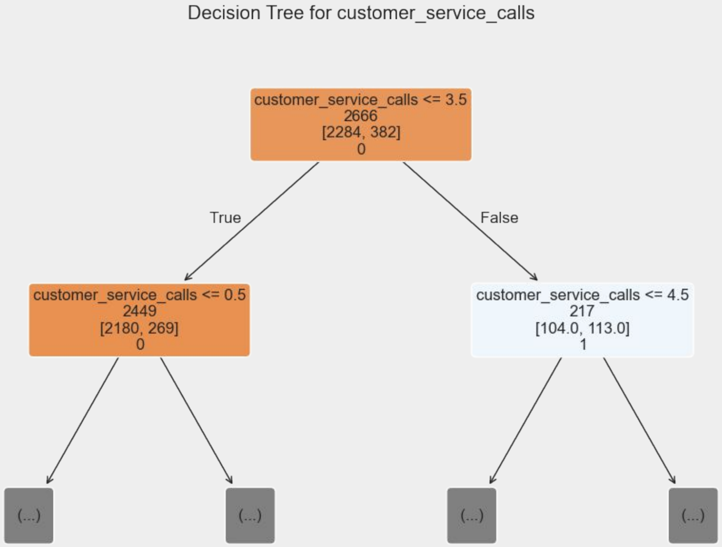


Decision Tree

*“customers with a total-charge **less** than 71.56 are likely to **not** churn”*

*“customers with a customer-service call count **less** than 3.5 are likely to **not** churn”*

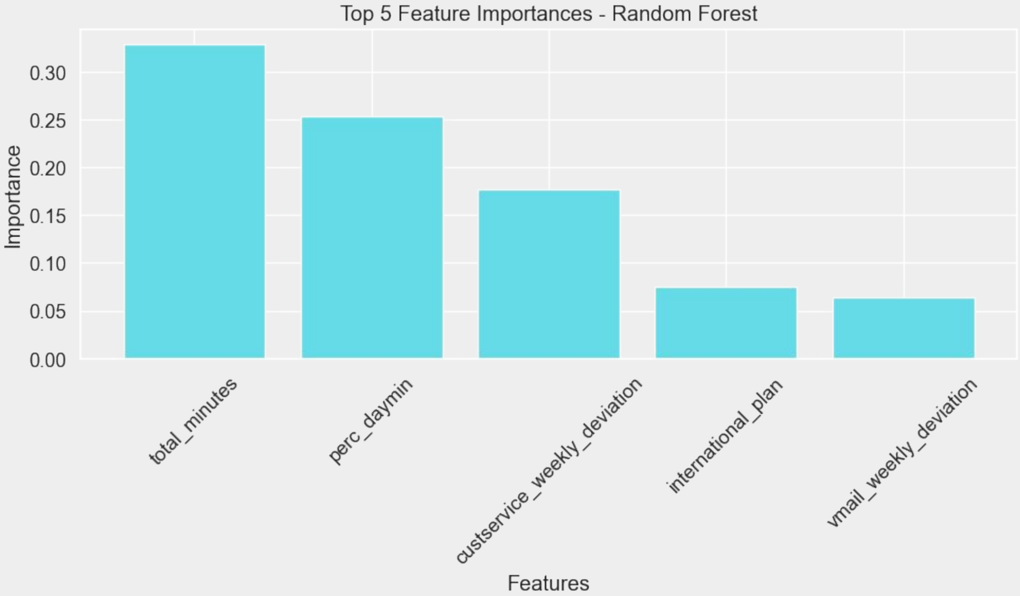




Feature Selection

Random Forest: Feature Selection

- Less sensitive to multicollinearity, captures non-linear relationships
- Ensembling method: combines predictions of multiple base models (decision trees)
- Measures reduction in purity across all decision trees in the forest



Logistic Regression

- Coefficient values
- Impact scale of 0-1

customer service:	**0.77**
total minutes:	**0.76**
international plan:	**0.68**
voice-mail plan:	**-0.36**

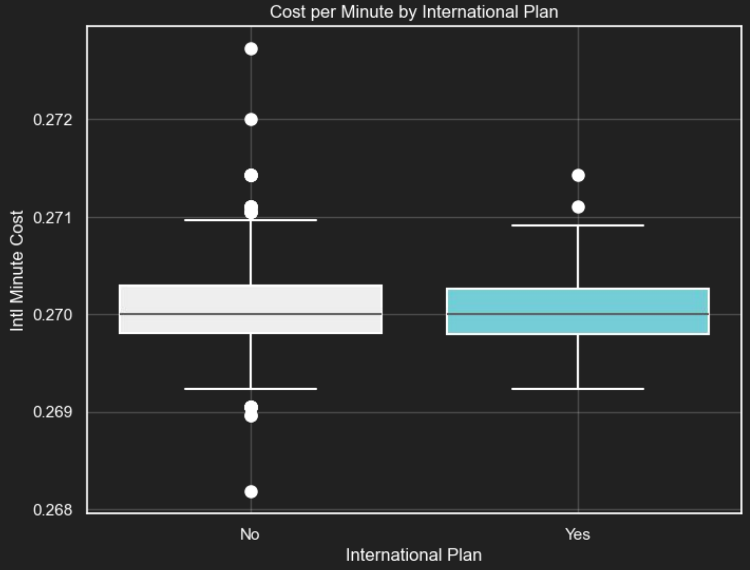
INTERNATIONAL PLAN

#3

Most important feature in final logistic regression model

0.68 coefficient

(subscribers likely to **churn**)



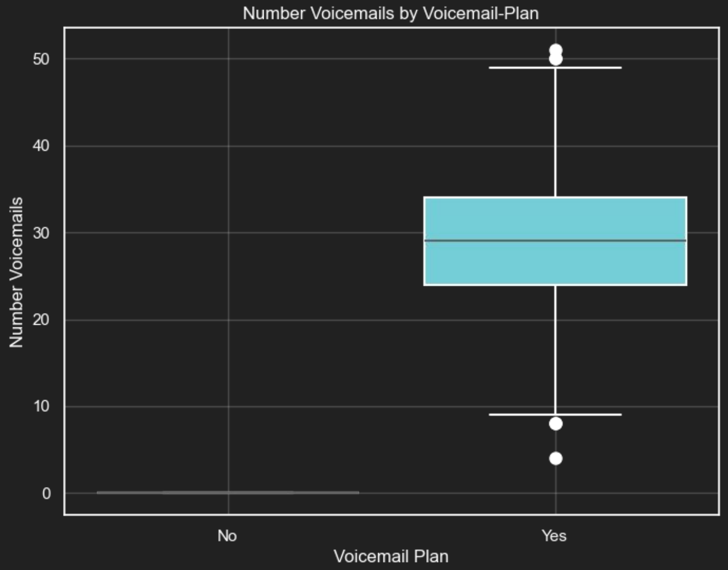
VOICEMAIL PLAN

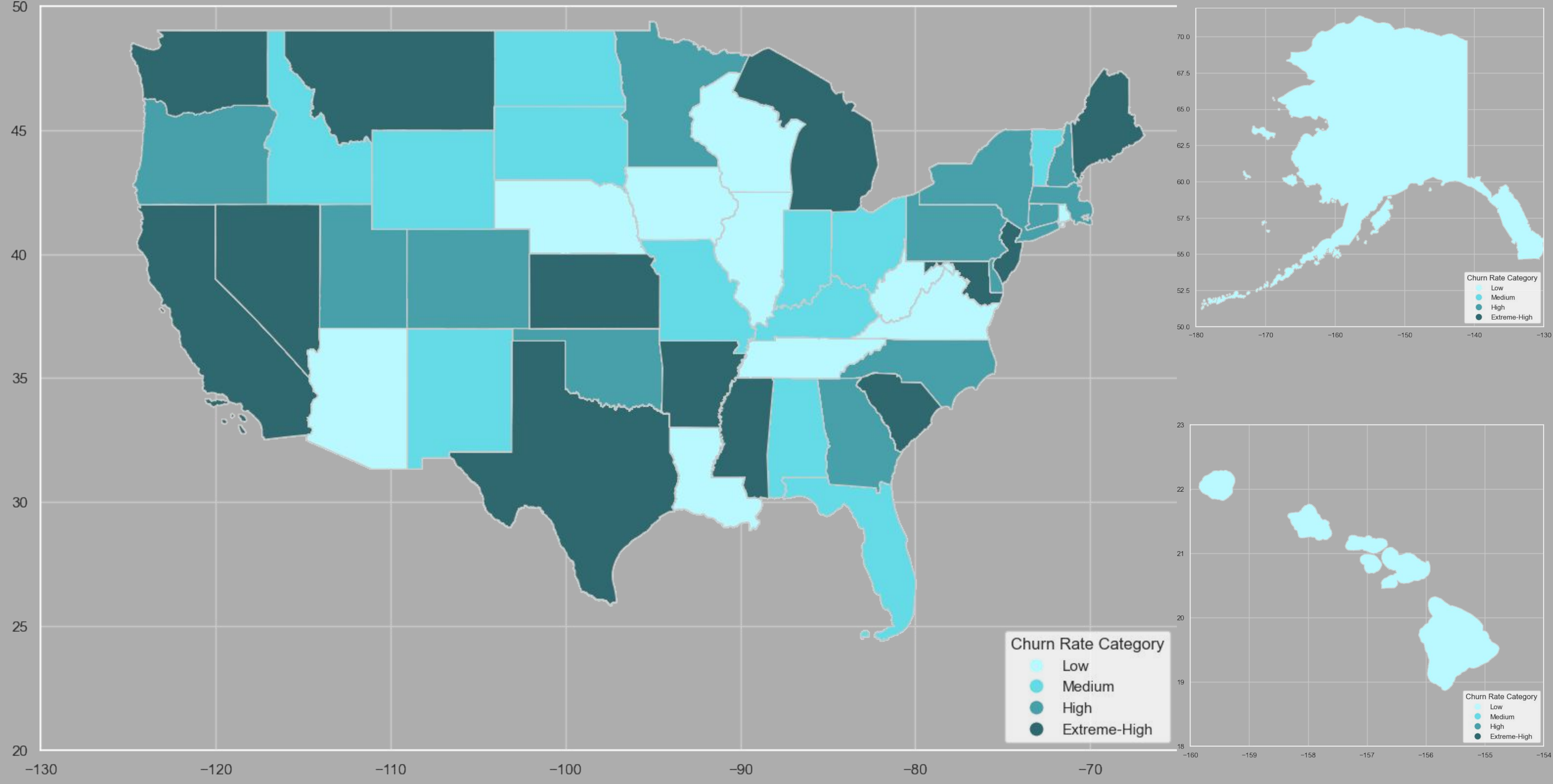
#4

Most important feature in final logistic regression model

-0.36 coefficient

(subscribers likely to **not churn**)

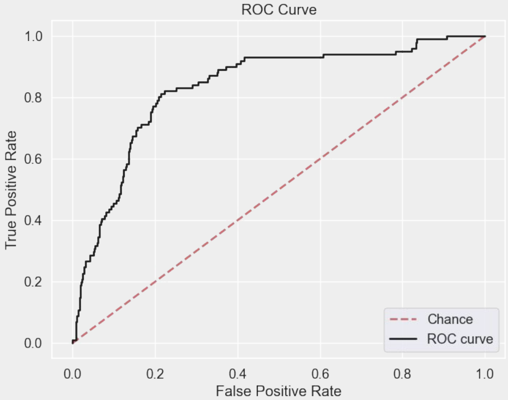



Churn Rate Category
Low
Medium
High
Extreme-High
50
45
40
35
30
25
20
−130
−120
−110
−100
−90
−80
−70

BEST MODEL: LOGISTIC REGRESSION

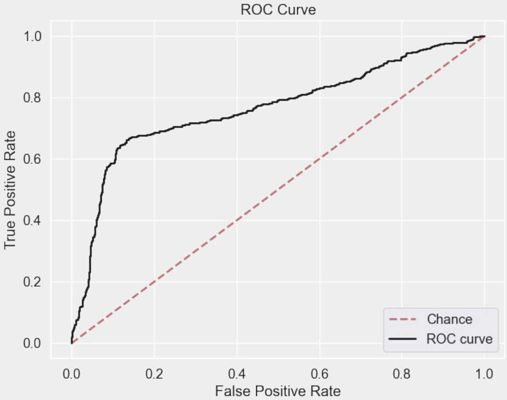
RAW

ROC-AUC: 0.83



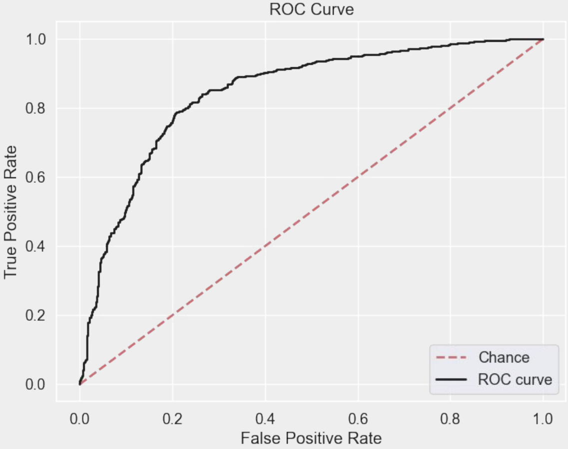
MID-ENGINEERING

ROC-AUC: 0.85



FINAL

ROC-AUC: 0.85



CONCLUSIONS

Key behaviors predictive of churn:

- 2+ **customer service calls**
- Increased **number of call-time minutes**, particularly during the **daytime** (most likely related to *increased charges*)
- Subscription to **international plan**
- Residing in a **high churn-rate state**

Key behaviors prediction of *no* churn:

- Subscription to **voicemail plan**

NEXT STEPS

Duration of Call & Daytime Calling

<u>PRICE-PER-MINUTE</u> (by time of day)

DAY: 0.17

EVENING: 0.085

NIGHT: 0.045

- **Reduce the rates for daytime minutes**
- Introduce more **flexible customisable pricing plans**

International Plan

- Differentiate the international plan
- Gather feedback from current international plan users
- Develop tailored international plans

NEXT STEPS

Customer Service Calls

- Collect and analyse data on customer service calls:
  - reason for call
  - type of issue
  - was the issue resolved
  - customer service experience satisfaction

State

- Collect and analyze additional data (feedback from customers) on reasons for churn in each state

Further Recommendations

Introduce new features for analysis, including Internet data usage and Internet data services

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Introduce new features on customers demographics (age, sex, family plan or not, number of people in family)

Include qualitative analysis for customer feedback to broaden understanding of features correlations

THANK YOU

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