

CHURN

- **Dataset: CHURN**
- **OBJECTIVE:** Find out why customer has moved to other providers, determine what type of the customers should we send promotional materials to make increase their chance to stay with the company.



CHURN - Executive Summary

- The business problem and the proposed solution



01

Customer is Goal 14.5% > 5%

02

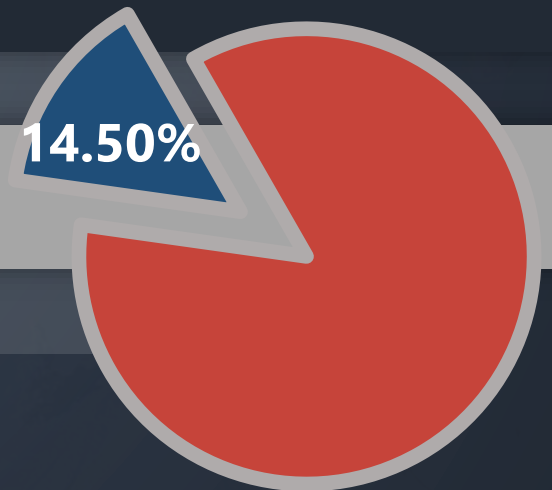
Models ---> Patterns ---> Target Group

03

Marketing Solutions

04

Churn Rate 14.5 ↓



CHURN - Introduction

George Washington University, School of Business
Introduction to Business Analytics

- The problem, why is it important, and the role of analytics in solving the problem



**Customer
Retention**



**Introduction to
the Dataset**



**Problems to
Solve**

CHURN - Methods

- The data, exploratory analysis, and the modeling approach or approaches used

Data Subset



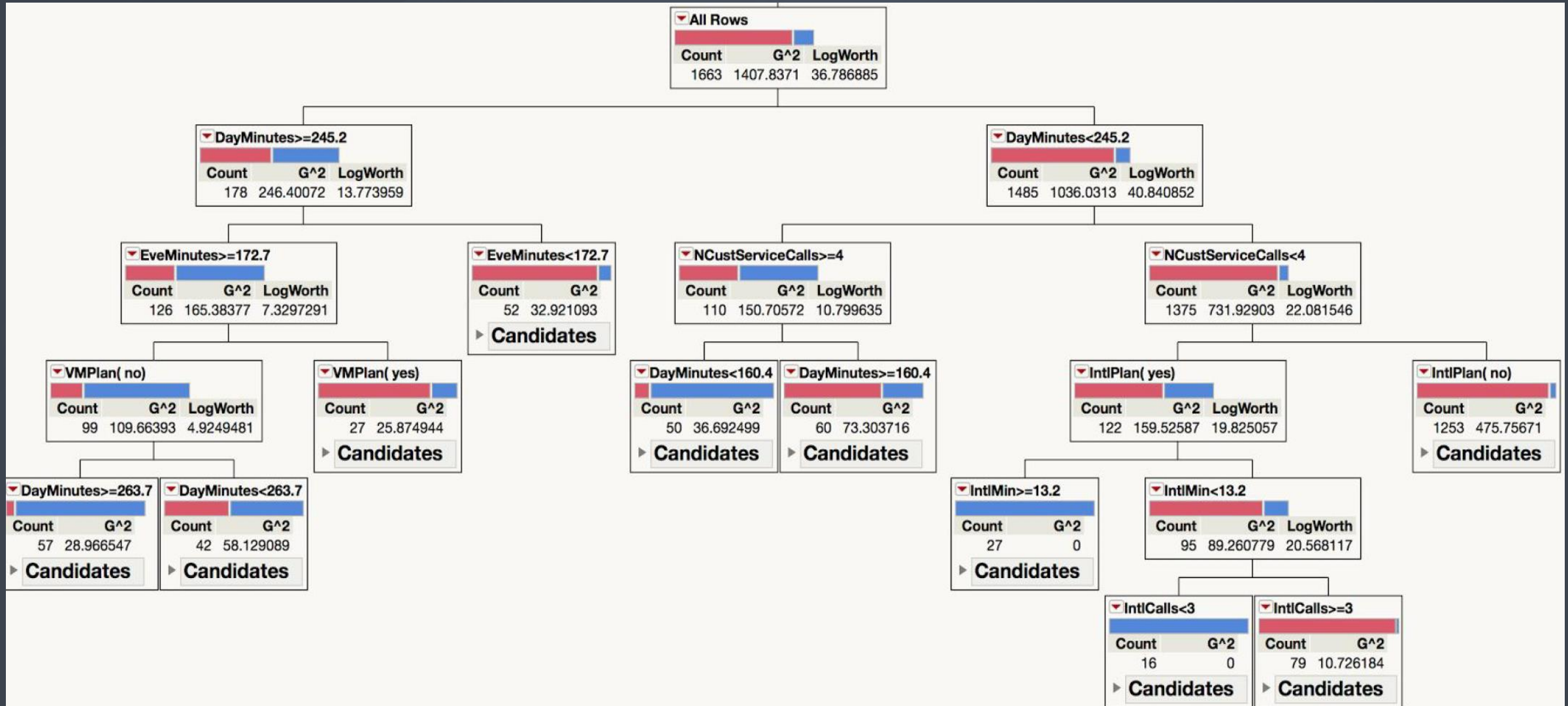
Missing Value



Mosaic Plot



CHURN – Decision Tree



CHURN - Results

- The selected model and model performance

Column Contributions

Term	Number of Splits	G^2	Portion
DayMinutes	3	188.68281	0.2835
NCustServiceCalls	1	153.396571	0.2305
IntlPlan	1	96.6464529	0.1452
IntlCalls	1	78.534595	0.1180
IntlMin	1	70.2650914	0.1056
EveMinutes	1	48.095861	0.0723
VMPlan	1	29.8448974	0.0448
State	0	0	0.0000
AcctLength	0	0	0.0000

Measure	Training	Validation	Test
Misclassification Rate	0.0710	0.0678	0.0712

Confusion Matrix

Actual \ Predicted	Test	
	False	True
Churn	False	True
False	703	22
True	38	80

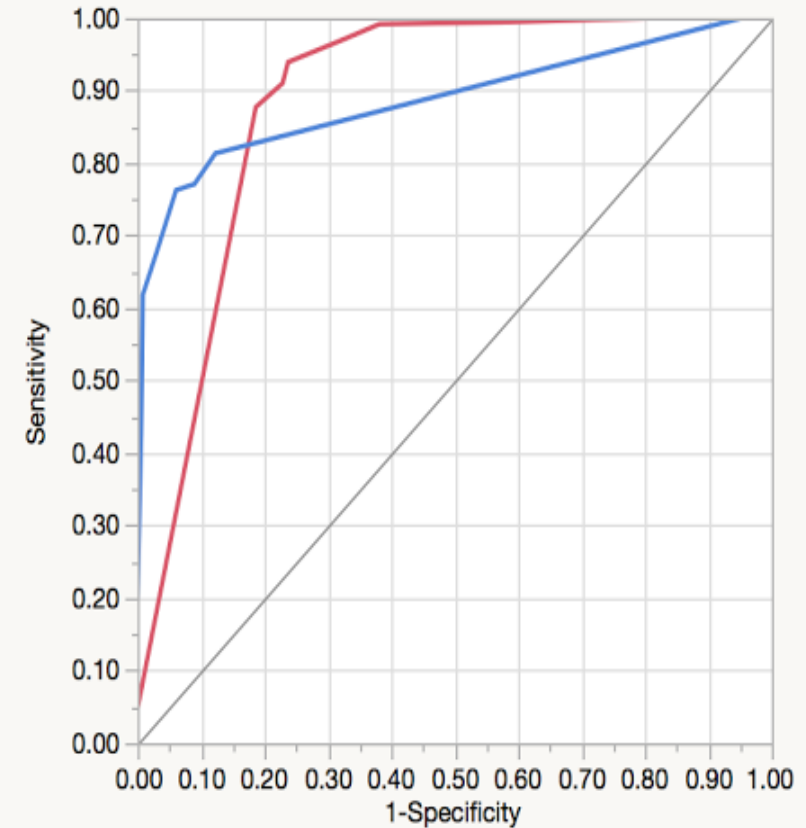
Misclassification Rate

$$= (FP+FN)/total=0.07$$

$$FPR=22/(22+703)= 0.031$$

$$FNR=38/(38+80)= 0.322$$

Receiver Operating Characteristic on Test Data



Churn	Area
False	0.8877
True	0.8877

CHURN - Results

- The selected model and model performance

Test			
Actual Churn	Decision Count		
	False	True	
False	660	65	
True	27	91	

Actual Churn	Decision Rate		
	False	True	
False	0.910	0.090	
True	0.229	0.771	

Misclassification Rate	
0.1091	



PROFIT MATRIX

	TRUE	FALSE	CONVERSION RATE 80%
TRUE	4.40	-10.00	
FALSE	8.00	10.00	

ORIGINAL

	TRUE	FALSE	PROFIT 6070.00
TRUE	0	118	
FALSE	0	725	

DECISION TREE(prob=0.5)

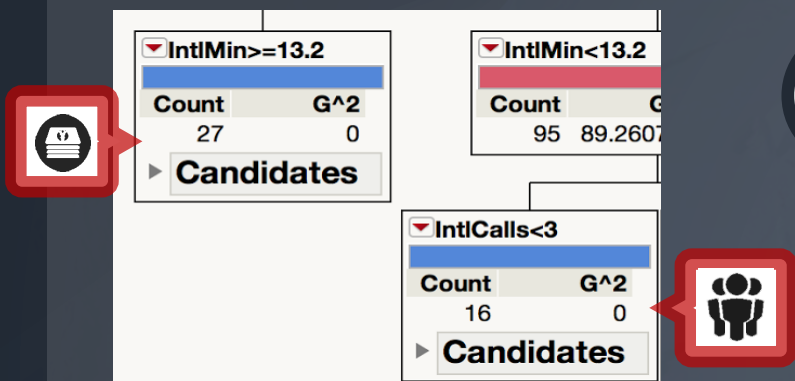
	TRUE	FALSE	PROFIT 7178.00	INCREASING RATE 18%
TRUE	80	38		
FALSE	22	703		

DECISION TREE(best profit)

	TRUE	FALSE	PROFIT 7250.40	INCREASING RATE 19%
TRUE	91	27		
FALSE	65	660		

CHURN – Target Group

- Link to business goal fit and key management insights



01

have **international plan**, international minute ≥ 13.2

02

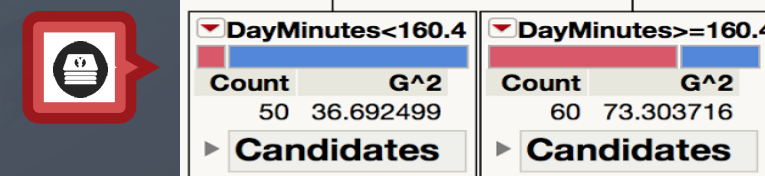
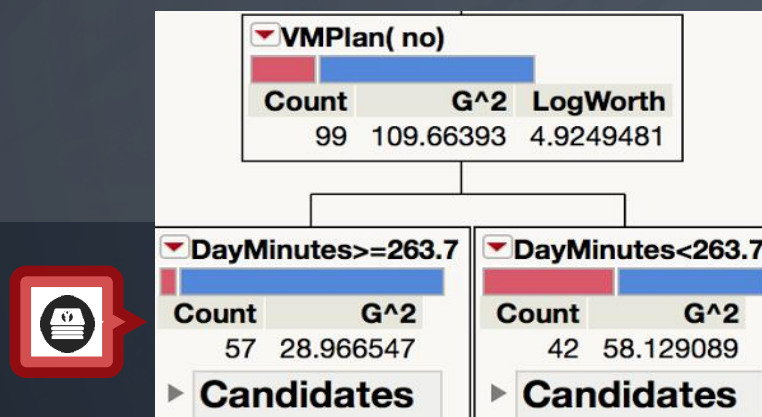
international minute < 13.2, international call < 3

03
04

day minute/evening minute **no voicemail plan**

05

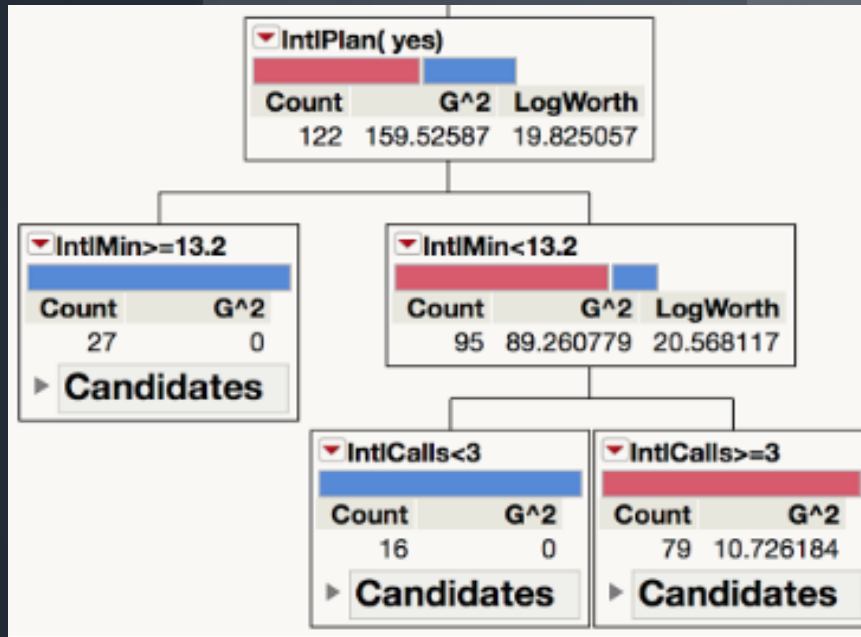
day minute < 160.4, customer service call ≥ 4



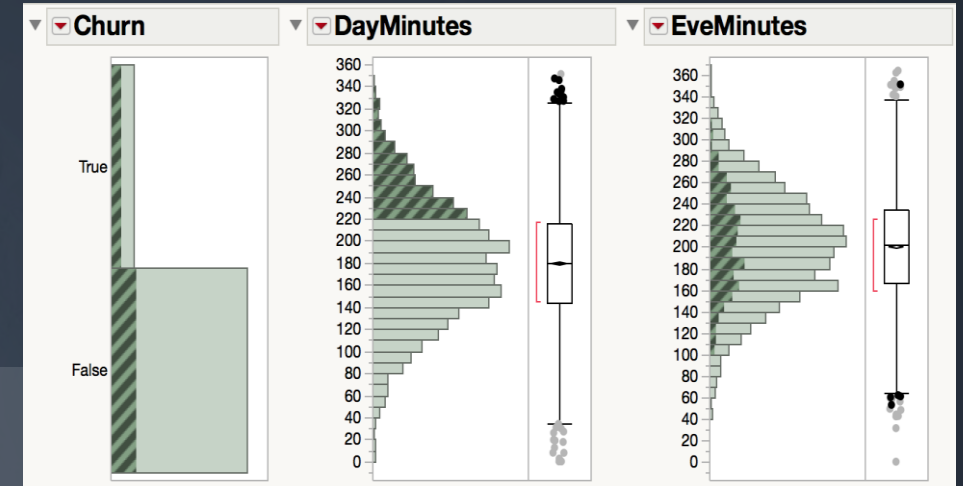
CHURN - Conclusion

- Link to business goal fit and key management insights

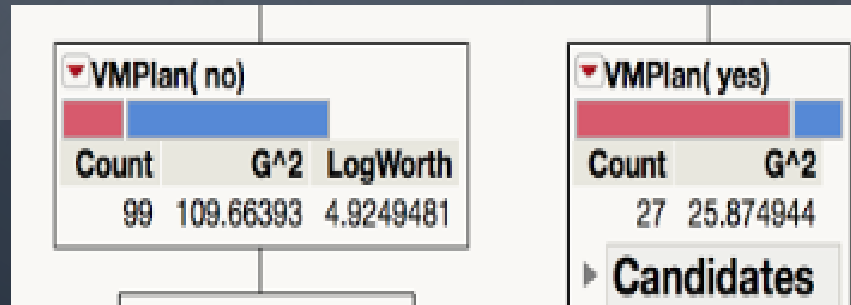
International Plans



DayCall Plans



Voicemail Plans



Customer Service

