Demo

"Forest" Results

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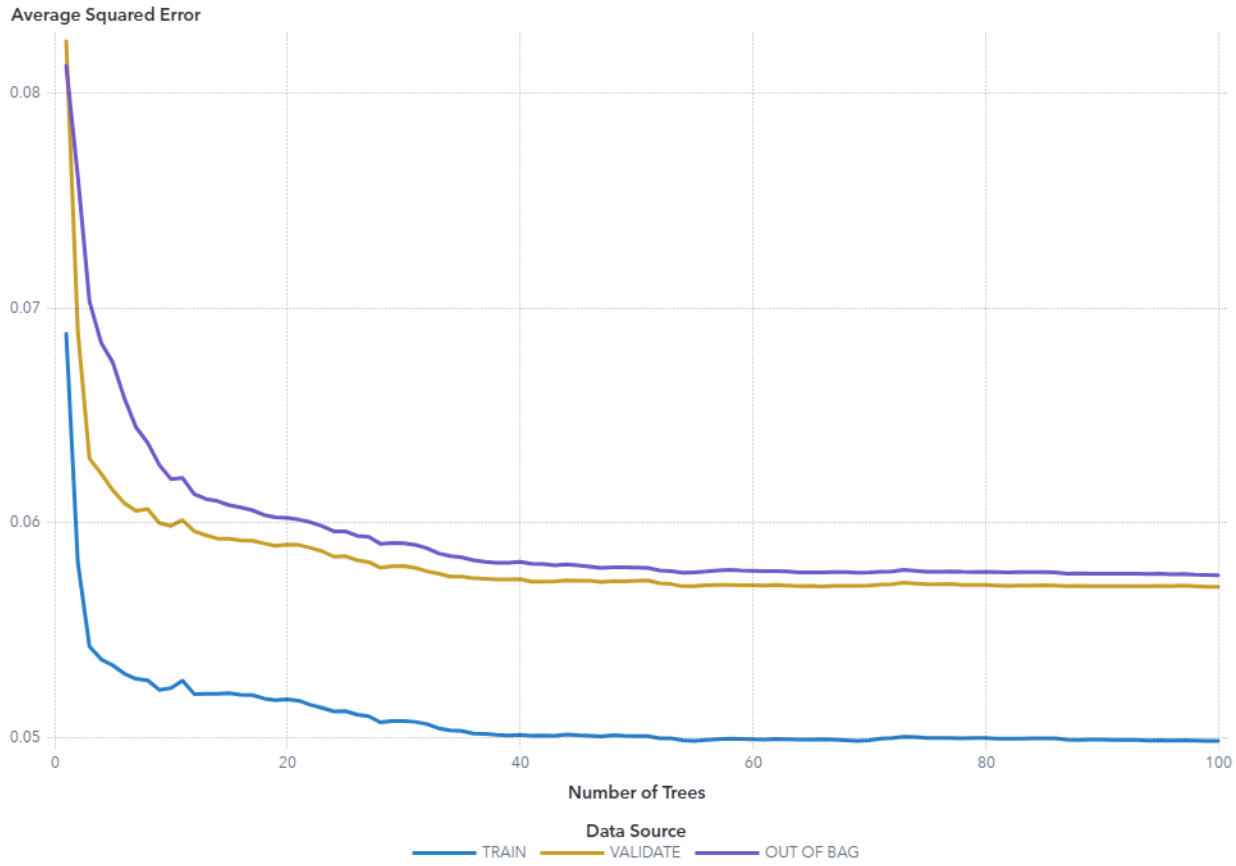
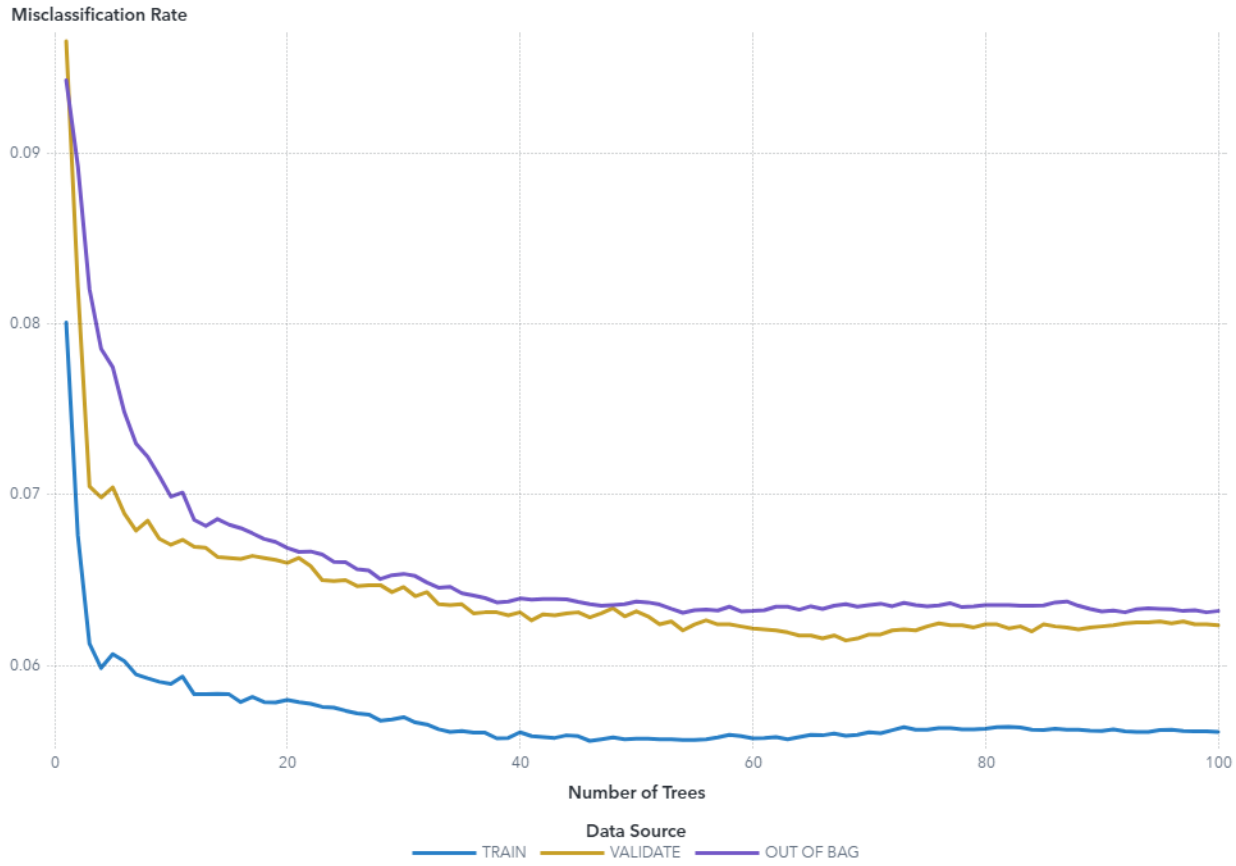
Contents

Average Squared Error



This plot shows how the average squared error changes as the number of trees in the forest increases. The training error typically decreases as the number of trees increases, but the error for the VALIDATE partition gives you an indication of how well your model generalizes. For this model, the minimum error for the VALIDATE partition is 0.057 and occurs for 100 trees, so the validation error is still decreasing at the last tree.

Misclassification Rate



This plot shows how the misclassification rate changes as the number of trees in the forest increases. The training error typically decreases as the number of trees increases, but the error for the VALIDATE partition gives you an indication of how well your model generalizes. For this model, the minimum error for the VALIDATE partition is 0.061 and occurs for 68 trees.

Variable Importance

Variable Label	Role	Variable Name	Training Importance
Number of Days Suspended	INPUT	curr_days_susp	427.6635
Total Days Over Plan	INPUT	ever_days_over_plan	251.9267
Days Suspended Last 6M	INPUT	avg_days_susp	187.7752
Handset Age Group	INPUT	handset_age_grp	162.9373
Transformed MB of Data Usage Month 5	INPUT	LOG_MB_Data_Usg_M05	116.5199
Delinquent Indicator	INPUT	delinq_indicator	104.4879
Replacement: Seconds of Data - Normalized	INPUT	REP_seconds_of_data_norm	92.8827
Transformed MB of Data Usage Month 4	INPUT	LOG_MB_Data_Usg_M04	84.7577
Total Late Payments Lifetime	INPUT	pymts_late_ltd	83.6371
Total Times Over Plan	INPUT	ever_times_over_plan	72.4270
Number of Times Suspended	INPUT	times_susp	69.9770
Transformed MB of Data Usage Month 6	INPUT	LOG_MB_Data_Usg_M06	68.0744
Transformed MB of Data Usage Month 7	INPUT	LOG_MB_Data_Usg_M07	59.5554
Total Calls to Care Lifetime	INPUT	calls_care_ltd	59.0403

Variable Label	Role	Variable Name	Training Importance
Transformed MB of Data Usage Month 8	INPUT	LOG_MB_Data_Usg_M08	48.5986
Imputed Seconds of Data - Natural Log	INPUT	IMP_seconds_of_data_log	45.9480
Imputed Transformed MB of Data Usage Month 9	INPUT	IMP_LOG_MB_Data_Usg_M09	43.9706
Open Work Orders	INPUT	wrk_orders	37.9000
Imputed Replacement: Minutes On Network Pct Change Month over Month	INPUT	IMP_REP_mou_onnet_pct_MOM	29.1655
Replacement: Calls Outgoing Peak	INPUT	REP_calls_out_pk	22.1362
Days of Open Work Orders	INPUT	days_openwrkorders	22.0787
Billing Cycle	INPUT	billing_cycle	21.2159
Replacement: Lifetime Value	INPUT	REP_lifetime_value	15.8318
Call Center Category 1	INPUT	call_category_1	15.2429
Replacement: Total Calls Curr	INPUT	REP_calls_total	14.2218
Account Region	INPUT	region	13.7371
Replacement: MB Data Usage Roam 3 Mths Prior	INPUT	REP_mb_data_usg_roamm03	12.6786
Account Ranking (RFM Score)	INPUT	rfm_score	12.1717

Variable Label	Role	Variable Name	Training Importance
9M Avg Billed Data Usage	INPUT	bill_data_usg_m09	11.7621
Replacement: 3M Avg Billed Data Usage	INPUT	REP_bill_data_usg_m03	11.5867
Replacement: Total MB of Data Usage	INPUT	REP_tot_mb_data_curr	11.4418
Replacement: MB Data Usage Roam 1 Mth Prior	INPUT	REP_mb_data_usg_roamm01	11.3851
Replacement: 6M Avg Billed Data Usage	INPUT	REP_bill_data_usg_m06	11.3160
Replacement: MB Data Usage 2 Mths Prior	INPUT	REP_mb_data_usg_m02	11.2148
Replacement: MB Data Usage 1 Mth Prior	INPUT	REP_mb_data_usg_m01	11.1920
Replacement: MB Data Usage Roam 2 Mths Prior	INPUT	REP_mb_data_usg_roamm02	10.6743
Imputed Replacement: Minutes Total Pct Change Month over Month	INPUT	IMP_REP_mou_total_pct_MOM	10.6316
Plan Name	INPUT	product_plan_desc	10.6243
Replacement: MB Data Usage 3 Mths Prior	INPUT	REP_mb_data_usg_m03	10.3635
Replacement: Total Voice Billed Minutes of Use	INPUT	REP_voice_tot_bill_mou_curr	10.3164

Variable Label	Role	Variable Name	Training Importance
Replacement: Calls Incoming Peak	INPUT	REP_calls_in_pk	9.9240
Replacement: Calls Incoming Off-Peak	INPUT	REP_calls_in_offpk	9.8382
Plan Data MB	INPUT	mb_inclplan	9.4809
Last Call Satisfaction Rating Given	INPUT	last_rep_sat_score	9.1668
Replacement: Calls Outgoing Off-Peak	INPUT	REP_calls_out_offpk	8.8644
Estimated HH Income	INPUT	Est_HH_Income	8.8424
Number Calls Tech Support	INPUT	calls_TS_acct	7.8927
Consecutive Mths Delinquent	INPUT	times_delinq	7.6461
Times Suspended Last 6M	INPUT	count_of_suspensions_6m	7.1898
Imputed Census Area Median Home Value Index	INPUT	IMP_cs_med_home_value	7.1225
Imputed Census Area Other	INPUT	IMP_cs_other	7.0673
Imputed Replacement: 6M Avg Billed Data Usage Normally Distributed	INPUT	IMP_REP_mb_data_ndist_mo6m	6.9990
Tech Support Complaints - LTD	INPUT	num_tsupcomplnts	6.8625
Resolved Complaints	INPUT	resolved_complnts	6.8513
Handset Mfg	INPUT	handset	6.7062

Variable Label	Role	Variable Name	Training Importance
Imputed Census Area Percent Home Owner	INPUT	IMP_cs_pct_home_owner	6.3949
Unresolved Tech Support Complaint - LTD	INPUT	unsolv_tsupcomplnt	6.3670
Imputed Census Area Caucasian	INPUT	IMP_cs_caucasian	6.3291
Account Tenure	INPUT	acct_age	6.2329
Forecasted Region Key	INPUT	forecast_region	6.2075
Imputed Replacement: Avg Age of Devices on Plan	INPUT	IMP_REP_data_device_age	6.1968
Imputed Census Area African-American	INPUT	IMP_cs_afr_amer	6.1956
Imputed Census Area Median Age	INPUT	IMP_cs_ttl_mdage	6.1532
Imputed Census Area Hispanic	INPUT	IMP_cs_hispanic	6.1450
Total Billed Data Usage	INPUT	bill_data_usg_tot	6.0017
Imputed Number of Data Records	INPUT	IMP_nbr_data_cdrs	5.9738
Imputed Census Area Total Males	INPUT	IMP_cs_ttl_male	5.9722
Account Zip Code Longitude	INPUT	zip_long	5.9677
Imputed Census Area Total Households	INPUT	IMP_cs_ttl_hhlds	5.8452

Variable Label	Role	Variable Name	Training Importance
Imputed Census Area Total Female	INPUT	IMP_cs_ttl_female	5.7926
Imputed Census Area Total Population	INPUT	IMP_cs_ttl_pop	5.7445
Account Zip Code	INPUT	zipcode_primary	5.3745
Imputed 3M Avg Revenue per User	INPUT	IMP_avg_arpu_3m	5.3493
Account Zip Code Latitude	INPUT	zip_lat	5.3211
Replacement: Total MB of Roam Data Usage	INPUT	REP_tot_mb_data_roam_curr	5.3053
Imputed Total Voice Charges	INPUT	IMP_tot_voice_chrgs_curr	5.1314
Handset Age	INPUT	equip_age	5.1276
Open Tech Support Complaints	INPUT	open_tsupcomplnts	4.4049
Imputed 3M Avg Data Charges	INPUT	IMP_avg_data_chrgs_3m	4.0511
Acquisition Channel	INPUT	sales_channel	3.5135
Plan Life Stage	INPUT	lifestage	3.1787
Credit Class	INPUT	credit_class	3.1460
Total Number Contracts Lifetime	INPUT	nbr_contracts_ltd	2.9050
Imputed Number of Dropped Calls 1 Mth Prior	INPUT	IMP_tot_drpd_pr1	2.8212
Imputed Census Area Total Urban	INPUT	IMP_cs_ttl_urban	2.7483
Imputed Census Area Total Rural	INPUT	IMP_cs_ttl_rural	2.7259

Variable Label	Role	Variable Name	Training Importance
Imputed 3M Avg Premium Data Charges	INPUT	IMP_avg_data_prem_chrgs_3m	2.6744
Number Calls Care Center	INPUT	calls_care_acct	2.6682
Number Times Customer Contacted	INPUT	nbr_contacts	2.6136
Imputed 3M Avg Overage Charges	INPUT	IMP_avg_overage_chrgs_3m	2.1914
Imputed Total Overage Charges	INPUT	IMP_tot_overage_chgs	1.9389
Imputed Premium Data Charges	INPUT	IMP_data_prem_chrgs_curr	1.6062
Number Calls Care Center 6 Month Avg	INPUT	calls_care_6mavg_acct	1.1947
Price Issues Discussed	INPUT	price_mention	1.0136
Own Apple	INPUT	mfg_apple	0.8890
Resolved Calls - 6Mo Average	INPUT	res_calls_6mavg_acct	0.7910
Number Calls Care Center 3 Month Avg	INPUT	calls_care_3mavg_acct	0.7365
Resolved Calls - 3Mo Average	INPUT	res_calls_3mavg_acct	0.6745
Own Samsung	INPUT	mfg_samsung	0.6533
Own Nokia	INPUT	mfg_nokia	0.4557
Service Issues Discussed	INPUT	service_mention	0.4415
Network Issues Discussed	INPUT	network_mention	0.4084
Own Motorola	INPUT	mfg_motorola	0.3832

Variable Label	Role	Variable Name	Training Importance
Own LG	INPUT	mfg_lg	0.3761
Xsell Upsell Flag	INPUT	upsell_xsell	0.3612
Pooled Rate Plan	INPUT	rp_pooled_ind	0.3586
Own HTC	INPUT	mfg_htc	0.2616

Importance Standard Deviation	Relative Importance
217.4439	1
139.2279	0.5891
125.8359	0.4391
115.7703	0.3810
118.6637	0.2725
72.4021	0.2443
72.8287	0.2172
88.6178	0.1982
63.4109	0.1956
50.1873	0.1694
60.6619	0.1636
63.0929	0.1592
59.6219	0.1393
43.8874	0.1381
35.1794	0.1136
45.7979	0.1074
37.7032	0.1028
28.5941	0.0886
32.1916	0.0682
27.1455	0.0518
18.5353	0.0516

Importance Standard Deviation	Relative Importance
8.7433	0.0496
11.7369	0.0370
7.4475	0.0356
12.9029	0.0333
7.7613	0.0321
11.7614	0.0296
12.8389	0.0285
9.2289	0.0275
9.7920	0.0271
7.7043	0.0268
9.5645	0.0266
9.1159	0.0265
10.0663	0.0262
11.4176	0.0262
10.7130	0.0250
12.5315	0.0249
5.7954	0.0248
10.0235	0.0242
6.7843	0.0241
7.2840	0.0232
7.5542	0.0230
5.4497	0.0222
6.2645	0.0214
6.1990	0.0207
5.6375	0.0207
5.4655	0.0185
6.6788	0.0179

Importance Standard Deviation	Relative Importance
5.3864	0.0168
5.4933	0.0167
5.2045	0.0165
6.9604	0.0164
6.0365	0.0160
5.6720	0.0160
5.4357	0.0157
4.4098	0.0150
5.6845	0.0149
4.6465	0.0148
4.8610	0.0146
4.6529	0.0145
4.0329	0.0145
4.4998	0.0145
5.0501	0.0144
4.4915	0.0144
4.5984	0.0140
5.2210	0.0140
4.1298	0.0140
4.7028	0.0140
3.9151	0.0137
4.1591	0.0135
3.9678	0.0134
4.3796	0.0126
4.3563	0.0125
4.0823	0.0124
5.5696	0.0124

Importance Standard Deviation	Relative Importance
4.2814	0.0120
3.8279	0.0120
4.4632	0.0103
3.8208	0.0095
2.9516	0.0082
2.9471	0.0074
2.9080	0.0074
3.1335	0.0068
3.3206	0.0066
2.4876	0.0064
3.0840	0.0064
3.0769	0.0063
2.9275	0.0062
3.0704	0.0061
3.1329	0.0051
2.4595	0.0045
2.5262	0.0038
2.0061	0.0028
1.9355	0.0024
1.6026	0.0021
1.9872	0.0018
1.4809	0.0017
2.1683	0.0016
1.4904	0.0015
1.2543	0.0011
1.1833	0.0010
1.1281	0.0010

Importance Standard Deviation	Relative Importance
1.0924	0.0009
0.9775	0.0009
1.3175	0.0008
1.0102	0.0008
0.7174	0.0006

Score Inputs

Name	Role	Variable Level	Type
acct_age	INPUT	INTERVAL	N
avg_arpu_3m	INPUT	INTERVAL	N
avg_data_chrgs_3m	INPUT	INTERVAL	N
avg_data_prem_chrgs_3m	INPUT	INTERVAL	N
avg_days_susp	INPUT	INTERVAL	N
avg_overage_chrgs_3m	INPUT	INTERVAL	N
billing_cycle	INPUT	NOMINAL	N
bill_data_usg_m03	INPUT	INTERVAL	N
bill_data_usg_m06	INPUT	INTERVAL	N
bill_data_usg_m09	INPUT	INTERVAL	N
bill_data_usg_tot	INPUT	INTERVAL	N
calls_care_3mavg_acct	INPUT	INTERVAL	N
calls_care_6mavg_acct	INPUT	INTERVAL	N
calls_care_acct	INPUT	NOMINAL	N
calls_care_ltd	INPUT	INTERVAL	N
calls_in_offpk	INPUT	INTERVAL	N
calls_in_pk	INPUT	INTERVAL	N
calls_out_offpk	INPUT	INTERVAL	N
calls_out_pk	INPUT	INTERVAL	N
calls_total	INPUT	INTERVAL	N
calls_TS_acct	INPUT	INTERVAL	N
call_category_1	INPUT	NOMINAL	C
count_of_suspensions_6m	INPUT	NOMINAL	N
credit_class	INPUT	NOMINAL	C

Name	Role	Variable Level	Type
cs_afr_amer	INPUT	INTERVAL	N
cs_caucasian	INPUT	INTERVAL	N
cs_hispanic	INPUT	INTERVAL	N
cs_med_home_value	INPUT	INTERVAL	N
cs_other	INPUT	INTERVAL	N
cs_pct_home_owner	INPUT	INTERVAL	N
cs_ttl_female	INPUT	INTERVAL	N
cs_ttl_hhlds	INPUT	INTERVAL	N
cs_ttl_male	INPUT	INTERVAL	N
cs_ttl_mdage	INPUT	INTERVAL	N
cs_ttl_pop	INPUT	INTERVAL	N
cs_ttl_rural	INPUT	INTERVAL	N
cs_ttl_urban	INPUT	INTERVAL	N
curr_days_susp	INPUT	INTERVAL	N
Customer_ID	ID	INTERVAL	N
data_device_age	INPUT	INTERVAL	N
data_prem_chrgs_curr	INPUT	INTERVAL	N
days_openwrkorders	INPUT	INTERVAL	N
delinq_indicator	INPUT	NOMINAL	N
equip_age	INPUT	INTERVAL	N
Est_HH_Income	INPUT	INTERVAL	N
ever_days_over_plan	INPUT	INTERVAL	N
ever_times_over_plan	INPUT	INTERVAL	N
forecast_region	INPUT	INTERVAL	N
handset	INPUT	NOMINAL	C

Name	Role	Variable Level	Type
handset_age_grp	INPUT	NOMINAL	C
last_rep_sat_score	INPUT	NOMINAL	N
lifestage	INPUT	NOMINAL	C
lifetime_value	INPUT	INTERVAL	N
mb_data_ndist_mo 6m	INPUT	INTERVAL	N
mb_data_usg_m01	INPUT	INTERVAL	N
mb_data_usg_m02	INPUT	INTERVAL	N
mb_data_usg_m03	INPUT	INTERVAL	N
MB_Data_Usg_M04	INPUT	INTERVAL	N
MB_Data_Usg_M05	INPUT	INTERVAL	N
MB_Data_Usg_M06	INPUT	INTERVAL	N
MB_Data_Usg_M07	INPUT	INTERVAL	N
MB_Data_Usg_M08	INPUT	INTERVAL	N
MB_Data_Usg_M09	INPUT	INTERVAL	N
mb_data_usg_roa mm01	INPUT	INTERVAL	N
mb_data_usg_roa mm02	INPUT	INTERVAL	N
mb_data_usg_roa mm03	INPUT	INTERVAL	N
mb_inclplan	INPUT	NOMINAL	N
mfg_apple	INPUT	BINARY	N
mfg_htc	INPUT	BINARY	N
mfg_lg	INPUT	BINARY	N
mfg_motorola	INPUT	BINARY	N
mfg_nokia	INPUT	BINARY	N
mfg_samsung	INPUT	BINARY	N
mou_onnet_pct_M OM	INPUT	INTERVAL	N

Name	Role	Variable Level	Type
mou_total_pct_MOM	INPUT	INTERVAL	N
nbr_contacts	INPUT	NOMINAL	N
nbr_contracts_ltd	INPUT	INTERVAL	N
nbr_data_cdrs	INPUT	INTERVAL	N
network_mention	INPUT	BINARY	N
num_tsupcomplnts	INPUT	NOMINAL	N
open_tsupcomplnts	INPUT	INTERVAL	N
price_mention	INPUT	NOMINAL	N
product_plan_desc	INPUT	NOMINAL	C
pymts_late_ltd	INPUT	NOMINAL	N
region	INPUT	NOMINAL	C
resolved_complnts	INPUT	NOMINAL	N
res_calls_3mavg_act	INPUT	INTERVAL	N
res_calls_6mavg_act	INPUT	INTERVAL	N
rfm_score	INPUT	INTERVAL	N
rp_pooled_ind	INPUT	NOMINAL	C
sales_channel	INPUT	NOMINAL	C
seconds_of_data_log	INPUT	INTERVAL	N
seconds_of_data_norm	INPUT	INTERVAL	N
service_mention	INPUT	BINARY	N
times_delinq	INPUT	NOMINAL	N
times_susp	INPUT	NOMINAL	N
tot_drpd_pr1	INPUT	INTERVAL	N
tot_mb_data_curr	INPUT	INTERVAL	N
tot_mb_data_roam_curr	INPUT	INTERVAL	N

Name	Role	Variable Level	Type
tot_overage_chgs	INPUT	INTERVAL	N
tot_voice_chrgs_curr	INPUT	INTERVAL	N
unsolv_tsupcomplnt	INPUT	NOMINAL	N
upsell_xsell	INPUT	BINARY	N
voice_tot_bill_mou_curr	INPUT	INTERVAL	N
wrk_orders	INPUT	NOMINAL	N
zipcode_primary	INPUT	INTERVAL	N
zip_lat	INPUT	INTERVAL	N
zip_long	INPUT	INTERVAL	N

Variable Type	Variable Label	Variable Format	Variable Length
double	Account Tenure	COMMA8.0	8
double	3M Avg Revenue per User	DOLLAR8.2	8
double	3M Avg Data Charges	DOLLAR8.2	8
double	3M Avg Premium Data Charges	DOLLAR8.2	8
double	Days Suspended Last 6M	BEST2.0	8
double	3M Avg Overage Charges	DOLLAR8.2	8
double	Billing Cycle	BESTD2.0	8
double	3M Avg Billed Data Usage	COMMA8.0	8
double	6M Avg Billed Data Usage	COMMA8.0	8
double	9M Avg Billed Data Usage	COMMA8.0	8
double	Total Billed Data	DOLLAR8.2	8

Variable Type	Variable Label	Variable Format	Variable Length
	Usage		
double	Number Calls Care Center 3 Month Avg	BEST2.0	8
double	Number Calls Care Center 6 Month Avg	BEST2.0	8
double	Number Calls Care Center	BEST2.0	8
double	Total Calls to Care Lifetime	BEST12.0	8
double	Calls Incoming Off-Peak	COMMA8.0	8
double	Calls Incoming Peak	COMMA8.0	8
double	Calls Outgoing Off-Peak	COMMA8.0	8
double	Calls Outgoing Peak	COMMA8.0	8
double	Total Calls Curr	COMMA8.0	8
double	Number Calls Tech Support	BEST2.0	8
char	Call Center Category 1	$CHAR28.	28
double	Times Suspended Last 6M	BEST2.0	8
char	Credit Class	$CHAR10.	10
double	Census Area African-American	BEST8.3	8
double	Census Area Caucasian	BEST8.3	8
double	Census Area Hispanic	BEST8.3	8
double	Census Area Median Home	BEST4.2	8

Variable Type	Variable Label	Variable Format	Variable Length
	Value Index		
double	Census Area Other	BEST8.3	8
double	Census Area Percent Home Owner	BEST8.3	8
double	Census Area Total Female	BEST8.3	8
double	Census Area Total Households	COMMA12.0	8
double	Census Area Total Males	BEST8.3	8
double	Census Area Median Age	BEST3.0	8
double	Census Area Total Population	COMMA12.0	8
double	Census Area Total Rural	BEST8.3	8
double	Census Area Total Urban	BEST8.3	8
double	Number of Days Suspended	BEST4.0	8
double	Primary Key	BEST12.0	8
double	Avg Age of Devices on Plan	COMMA10.0	8
double	Premium Data Charges	DOLLAR8.2	8
double	Days of Open Work Orders	BEST2.0	8
double	Delinquent Indicator	BEST2.0	8
double	Handset Age	BEST3.0	8
double	Estimated HH Income	DOLLAR8.0	8

Variable Type	Variable Label	Variable Format	Variable Length
double	Total Days Over Plan	BEST2.0	8
double	Total Times Over Plan	BEST2.0	8
double	Forecasted Region Key	BEST12.0	8
char	Handset Mfg	$CHAR8.	8
char	Handset Age Group	$CHAR12.	12
double	Last Call Satisfaction Rating Given	BEST2.0	8
char	Plan Life Stage	$CHAR13.	13
double	Lifetime Value	DOLLAR8.2	8
double	6M Avg Billed Data Usage Normally Distributed	BEST12.0	8
double	MB Data Usage 1 Mth Prior	COMMA8.0	8
double	MB Data Usage 2 Mths Prior	COMMA8.0	8
double	MB Data Usage 3 Mths Prior	COMMA8.0	8
double	MB of Data Usage Month 4	BEST12.0	8
double	MB of Data Usage Month 5	BEST12.0	8
double	MB of Data Usage Month 6	BEST12.0	8
double	MB of Data Usage Month 7	BEST12.0	8
double	MB of Data Usage Month 8	BEST12.0	8
double	MB of Data Usage	BEST12.0	8

Variable Type	Variable Label	Variable Format	Variable Length
	Month 9		
double	MB Data Usage Roam 1 Mth Prior	COMMA8.0	8
double	MB Data Usage Roam 2 Mths Prior	COMMA8.0	8
double	MB Data Usage Roam 3 Mths Prior	COMMA8.0	8
double	Plan Data MB	BEST8.0	8
double	Own Apple	BEST2.0	8
double	Own HTC	BEST2.0	8
double	Own LG	BEST2.0	8
double	Own Motorola	BEST2.0	8
double	Own Nokia	BEST2.0	8
double	Own Samsung	BEST2.0	8
double	Minutes On Network Pct Change Month over Month	PERCENT8.2	8
double	Minutes Total Pct Change Month over Month	PERCENT8.2	8
double	Number Times Customer Contacted	COMMA6.0	8
double	Total Number Contracts Lifetime	BEST2.0	8
double	Number of Data Records	COMMA10.0	8
double	Network Issues Discussed	BEST2.0	8
double	Tech Support Complaints - LTD	BEST2.0	8

Variable Type	Variable Label	Variable Format	Variable Length
double	Open Tech Support Complaints	BEST2.0	8
double	Price Issues Discussed	BEST2.0	8
char	Plan Name	$CHAR24.	24
double	Total Late Payments Lifetime	BEST2.0	8
char	Account Region	$CHAR13.	13
double	Resolved Complaints	BEST2.0	8
double	Resolved Calls - 3Mo Average	BEST2.0	8
double	Resolved Calls - 6Mo Average	BEST2.0	8
double	Account Ranking (RFM Score)	BEST3.0	8
char	Pooled Rate Plan	$CHAR1.	1
char	Acquisition Channel	$CHAR24.	24
double	Seconds of Data - Natural Log		8
double	Seconds of Data - Normalized		8
double	Service Issues Discussed	BEST2.0	8
double	Consecutive Mths Delinquent	BEST8.0	8
double	Number of Times Suspended	BEST4.0	8
double	Number of Dropped Calls 1 Mth Prior	COMMA8.0	8
double	Total MB of Data Usage	COMMA8.0	8

Variable Type	Variable Label	Variable Format	Variable Length
double	Total MB of Roam Data Usage	COMMA8.0	8
double	Total Overage Charges	DOLLAR8.2	8
double	Total Voice Charges	DOLLAR8.2	8
double	Unresolved Tech Support Complaint - LTD	BEST2.0	8
double	Xsell Upsell Flag	BEST2.0	8
double	Total Voice Billed Minutes of Use	COMMA8.0	8
double	Open Work Orders	BEST8.0	8
double	Account Zip Code	Z5.0	8
double	Account Zip Code Latitude	BEST8.3	8
double	Account Zip Code Longitude	BEST8.3	8

Score Outputs

Name	Role	Type	Variable Type
EM_CLASSIFICATION	CLASSIFICATION	C	char
EM_EVENTPROBABILITY	PREDICT	N	double
EM_PROBABILITY	PREDICT	N	double
IMP_LOG_MB_Data_Usg_M09	INPUT	N	double
IMP_REP_data_device_age	INPUT	N	double
IMP_REP_mb_data_ndist_mo6m	INPUT	N	double
IMP_REP_mou_onnet_pct_MOM	INPUT	N	double
IMP_REP_mou_total_pct_MOM	INPUT	N	double
IMP_avg_arpu_3m	INPUT	N	double
IMP_avg_data_chrgs_3m	INPUT	N	double
IMP_avg_data_prem_chrgs_3m	INPUT	N	double
IMP_avg_overage_chrgs_3m	INPUT	N	double
IMP_cs_afr_amer	INPUT	N	double
IMP_cs_caucasian	INPUT	N	double
IMP_cs_hispanic	INPUT	N	double
IMP_cs_med_home_value	INPUT	N	double
IMP_cs_other	INPUT	N	double
IMP_cs_pct_home_owner	INPUT	N	double
IMP_cs_ttl_female	INPUT	N	double

Name	Role	Type	Variable Type
IMP_cs_ttl_hhlds	INPUT	N	double
IMP_cs_ttl_male	INPUT	N	double
IMP_cs_ttl_mdage	INPUT	N	double
IMP_cs_ttl_pop	INPUT	N	double
IMP_cs_ttl_rural	INPUT	N	double
IMP_cs_ttl_urban	INPUT	N	double
IMP_data_prem_chrgs_curr	INPUT	N	double
IMP_nbr_data_cdrs	INPUT	N	double
IMP_seconds_of_data_log	INPUT	N	double
IMP_tot_drpd_pr1	INPUT	N	double
IMP_tot_overage_chgs	INPUT	N	double
IMP_tot_voice_chrgs_curr	INPUT	N	double
I_churn	CLASSIFICATION	C	char
LOG_MB_Data_Usg_M04	INPUT	N	double
LOG_MB_Data_Usg_M05	INPUT	N	double
LOG_MB_Data_Usg_M06	INPUT	N	double
LOG_MB_Data_Usg_M07	INPUT	N	double
LOG_MB_Data_Usg_M08	INPUT	N	double
LOG_MB_Data_Usg_M09	REJECTED	N	double
P_churn0	PREDICT	N	double
P_churn1	PREDICT	N	double
REP_bill_data_usg	INPUT	N	double

Name	Role	Type	Variable Type
_m03			
REP_bill_data_usg_m06	INPUT	N	double
REP_calls_in_offpk	INPUT	N	double
REP_calls_in_pk	INPUT	N	double
REP_calls_out_offpk	INPUT	N	double
REP_calls_out_pk	INPUT	N	double
REP_calls_total	INPUT	N	double
REP_data_device_age	REJECTED	N	double
REP_lifetime_value	INPUT	N	double
REP_mb_data_ndist_mo6m	REJECTED	N	double
REP_mb_data_usg_m01	INPUT	N	double
REP_mb_data_usg_m02	INPUT	N	double
REP_mb_data_usg_m03	INPUT	N	double
REP_mb_data_usg_roamm01	INPUT	N	double
REP_mb_data_usg_roamm02	INPUT	N	double
REP_mb_data_usg_roamm03	INPUT	N	double
REP_mou_onnet_pct_MOM	REJECTED	N	double
REP_mou_total_pct_MOM	REJECTED	N	double
REP_seconds_of_data_norm	INPUT	N	double

Name	Role	Type	Variable Type
REP_tot_mb_data_curr	INPUT	N	double
REP_tot_mb_data_roam_curr	INPUT	N	double
REP_voice_tot_bill_mou_curr	INPUT	N	double
WARN	ASSESS	C	char

Variable Label	Variable Format	Variable Length	Creator
Predicted for churn		2	forest
Probability for churn=1		8	forest
Probability of Classification		8	forest
Imputed Transformed MB of Data Usage Month 9		8	impute
Imputed Replacement: Avg Age of Devices on Plan	COMMA10.0	8	impute
Imputed Replacement: 6M Avg Billed Data Usage Normally Distributed	BEST12.0	8	impute
Imputed Replacement: Minutes On Network Pct Change Month over Month	PERCENT8.2	8	impute
Imputed Replacement:	PERCENT8.2	8	impute

Variable Label	Variable Format	Variable Length	Creator
Minutes Total Pct Change Month over Month			
Imputed 3M Avg Revenue per User	DOLLAR8.2	8	impute
Imputed 3M Avg Data Charges	DOLLAR8.2	8	impute
Imputed 3M Avg Premium Data Charges	DOLLAR8.2	8	impute
Imputed 3M Avg Overage Charges	DOLLAR8.2	8	impute
Imputed Census Area African-American	BEST8.3	8	impute
Imputed Census Area Caucasian	BEST8.3	8	impute
Imputed Census Area Hispanic	BEST8.3	8	impute
Imputed Census Area Median Home Value Index	BEST4.2	8	impute
Imputed Census Area Other	BEST8.3	8	impute
Imputed Census Area Percent Home Owner	BEST8.3	8	impute
Imputed Census Area Total Female	BEST8.3	8	impute
Imputed Census Area Total Households	COMMA12.0	8	impute
Imputed Census Area Total Males	BEST8.3	8	impute

Variable Label	Variable Format	Variable Length	Creator
Imputed Census Area Median Age	BEST3.0	8	impute
Imputed Census Area Total Population	COMMA12.0	8	impute
Imputed Census Area Total Rural	BEST8.3	8	impute
Imputed Census Area Total Urban	BEST8.3	8	impute
Imputed Premium Data Charges	DOLLAR8.2	8	impute
Imputed Number of Data Records	COMMA10.0	8	impute
Imputed Seconds of Data - Natural Log		8	impute
Imputed Number of Dropped Calls 1 Mth Prior	COMMA8.0	8	impute
Imputed Total Overage Charges	DOLLAR8.2	8	impute
Imputed Total Voice Charges	DOLLAR8.2	8	impute
Into: churn		2	forest
Transformed MB of Data Usage Month 4		8	transform
Transformed MB of Data Usage Month 5		8	transform
Transformed MB of Data Usage Month 6		8	transform
Transformed MB of Data Usage Month		8	transform

Variable Label	Variable Format	Variable Length	Creator
7			
Transformed MB of Data Usage Month 8		8	transform
Transformed MB of Data Usage Month 9		8	transform
Predicted: churn=0		8	forest
Predicted: churn=1		8	forest
Replacement: 3M Avg Billed Data Usage	COMMA8.0	8	replacement
Replacement: 6M Avg Billed Data Usage	COMMA8.0	8	replacement
Replacement: Calls Incoming Off-Peak	COMMA8.0	8	replacement
Replacement: Calls Incoming Peak	COMMA8.0	8	replacement
Replacement: Calls Outgoing Off-Peak	COMMA8.0	8	replacement
Replacement: Calls Outgoing Peak	COMMA8.0	8	replacement
Replacement: Total Calls Curr	COMMA8.0	8	replacement
Replacement: Avg Age of Devices on Plan	COMMA10.0	8	replacement
Replacement: Lifetime Value	DOLLAR8.2	8	replacement
Replacement: 6M Avg Billed Data Usage Normally Distributed	BEST12.0	8	replacement

Variable Label	Variable Format	Variable Length	Creator
Replacement: MB Data Usage 1 Mth Prior	COMMA8.0	8	replacement
Replacement: MB Data Usage 2 Mths Prior	COMMA8.0	8	replacement
Replacement: MB Data Usage 3 Mths Prior	COMMA8.0	8	replacement
Replacement: MB Data Usage Roam 1 Mth Prior	COMMA8.0	8	replacement
Replacement: MB Data Usage Roam 2 Mths Prior	COMMA8.0	8	replacement
Replacement: MB Data Usage Roam 3 Mths Prior	COMMA8.0	8	replacement
Replacement: Minutes On Network Pct Change Month over Month	PERCENT8.2	8	replacement
Replacement: Minutes Total Pct Change Month over Month	PERCENT8.2	8	replacement
Replacement: Seconds of Data - Normalized		8	replacement
Replacement: Total MB of Data Usage	COMMA8.0	8	replacement
Replacement: Total MB of Roam Data Usage	COMMA8.0	8	replacement

Variable Label	Variable Format	Variable Length	Creator
Replacement: Total Voice Billed Minutes of Use	COMMA8.0	8	replacement
Warnings		4	forest

Function	Creator GUID
CLASSIFICATION	c0d17cab-88c5-48dc-951c-1bf18820dd55
PREDICT	c0d17cab-88c5-48dc-951c-1bf18820dd55
PREDICT	c0d17cab-88c5-48dc-951c-1bf18820dd55
TRANSFORM	907a829f-c39c-4442-9da4-a51e2549996f
TRANSFORM	907a829f-c39c-4442-9da4-a51e2549996f
TRANSFORM	907a829f-c39c-4442-9da4-a51e2549996f
TRANSFORM	907a829f-c39c-4442-9da4-a51e2549996f
TRANSFORM	907a829f-c39c-4442-9da4-a51e2549996f
TRANSFORM	907a829f-c39c-4442-9da4-a51e2549996f
TRANSFORM	907a829f-c39c-4442-9da4-

Function	Creator GUID
	a51e2549996f
TRANSFORM	907a829f-c39c-4442-9da4-a51e2549996f
TRANSFORM	907a829f-c39c-4442-9da4-a51e2549996f
TRANSFORM	907a829f-c39c-4442-9da4-a51e2549996f
TRANSFORM	907a829f-c39c-4442-9da4-a51e2549996f
TRANSFORM	907a829f-c39c-4442-9da4-a51e2549996f
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TRANSFORM	907a829f-c39c-4442-9da4-a51e2549996f
TRANSFORM	907a829f-c39c-4442-9da4-a51e2549996f

Function	Creator GUID
TRANSFORM	907a829f-c39c-4442-9da4-a51e2549996f
TRANSFORM	907a829f-c39c-4442-9da4-a51e2549996f
TRANSFORM	907a829f-c39c-4442-9da4-a51e2549996f
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TRANSFORM	907a829f-c39c-4442-9da4-a51e2549996f
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CLASSIFICATION	c0d17cab-88c5-48dc-951c-1bf18820dd55
TRANSFORM	7cd5f313-cfef-45df-abd8-746010ad74d

Function	Creator GUID
	4
TRANSFORM	7cd5f313-cfef-45df-abd8-746010ad74d4
TRANSFORM	7cd5f313-cfef-45df-abd8-746010ad74d4
TRANSFORM	7cd5f313-cfef-45df-abd8-746010ad74d4
TRANSFORM	7cd5f313-cfef-45df-abd8-746010ad74d4
TRANSFORM	7cd5f313-cfef-45df-abd8-746010ad74d4
PREDICT	c0d17cab-88c5-48dc-951c-1bf18820dd55
PREDICT	c0d17cab-88c5-48dc-951c-1bf18820dd55
TRANSFORM	2c293f10-115e-4978-9f1d-0a2aa860a950
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TRANSFORM	2c293f10-115e-4978-9f1d-0a2aa860a950
TRANSFORM	2c293f10-115e-4978-9f1d-0a2aa860a950

Function	Creator GUID
TRANSFORM	2c293f10-115e-4978-9f1d-0a2aa860a950
TRANSFORM	2c293f10-115e-4978-9f1d-0a2aa860a950
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TRANSFORM	2c293f10-115e-4978-9f1d-0a2aa860a950
TRANSFORM	2c293f10-115e-4978-9f1d-0a2aa860a950
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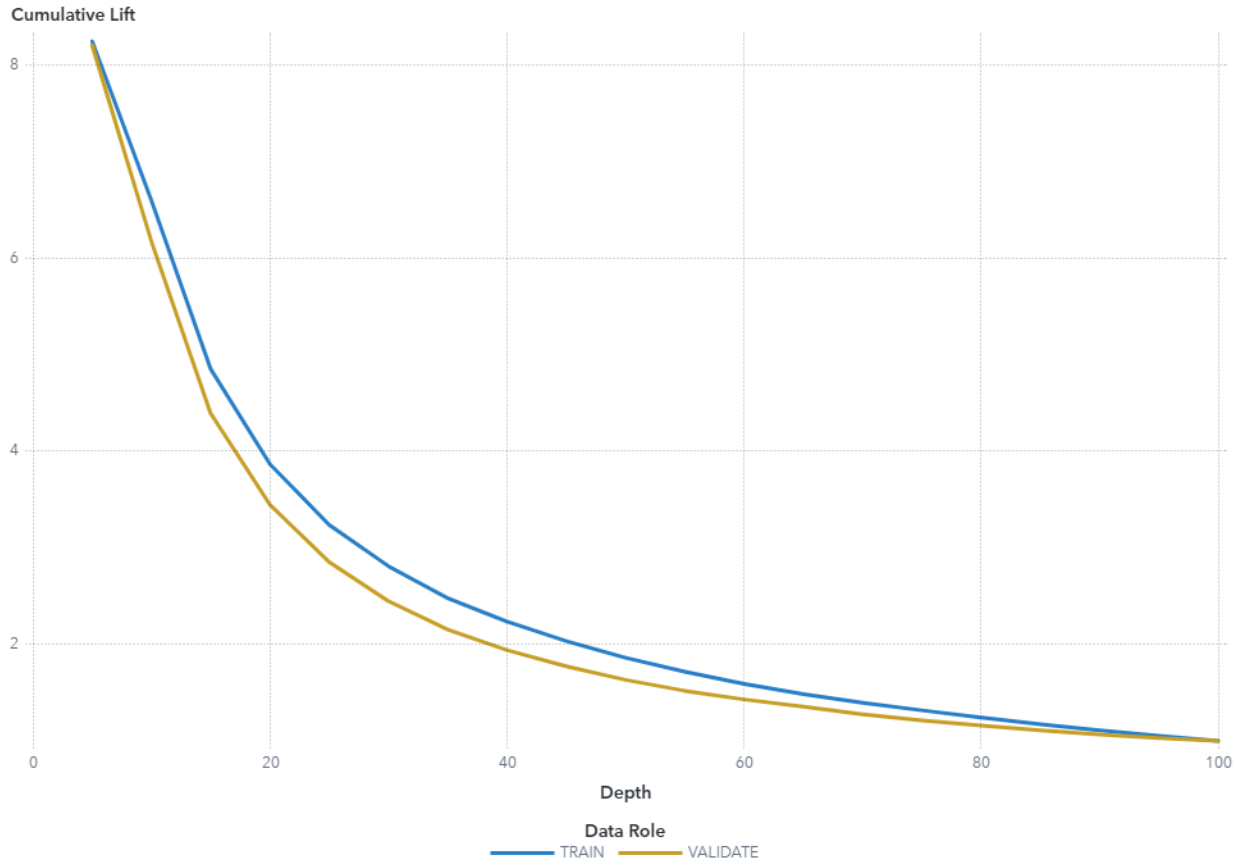
TRANSFORM	2c293f10-115e-4978-9f1d-0a2aa860a9

Function	Creator GUID
	50
TRANSFORM	2c293f10-115e-4978-9f1d-0a2aa860a950
TRANSFORM	2c293f10-115e-4978-9f1d-0a2aa860a950
TRANSFORM	2c293f10-115e-4978-9f1d-0a2aa860a950
TRANSFORM	2c293f10-115e-4978-9f1d-0a2aa860a950
TRANSFORM	2c293f10-115e-4978-9f1d-0a2aa860a950
TRANSFORM	2c293f10-115e-4978-9f1d-0a2aa860a950
ASSESS	c0d17cab-88c5-48dc-951c-1bf18820dd55

Cumulative Lift



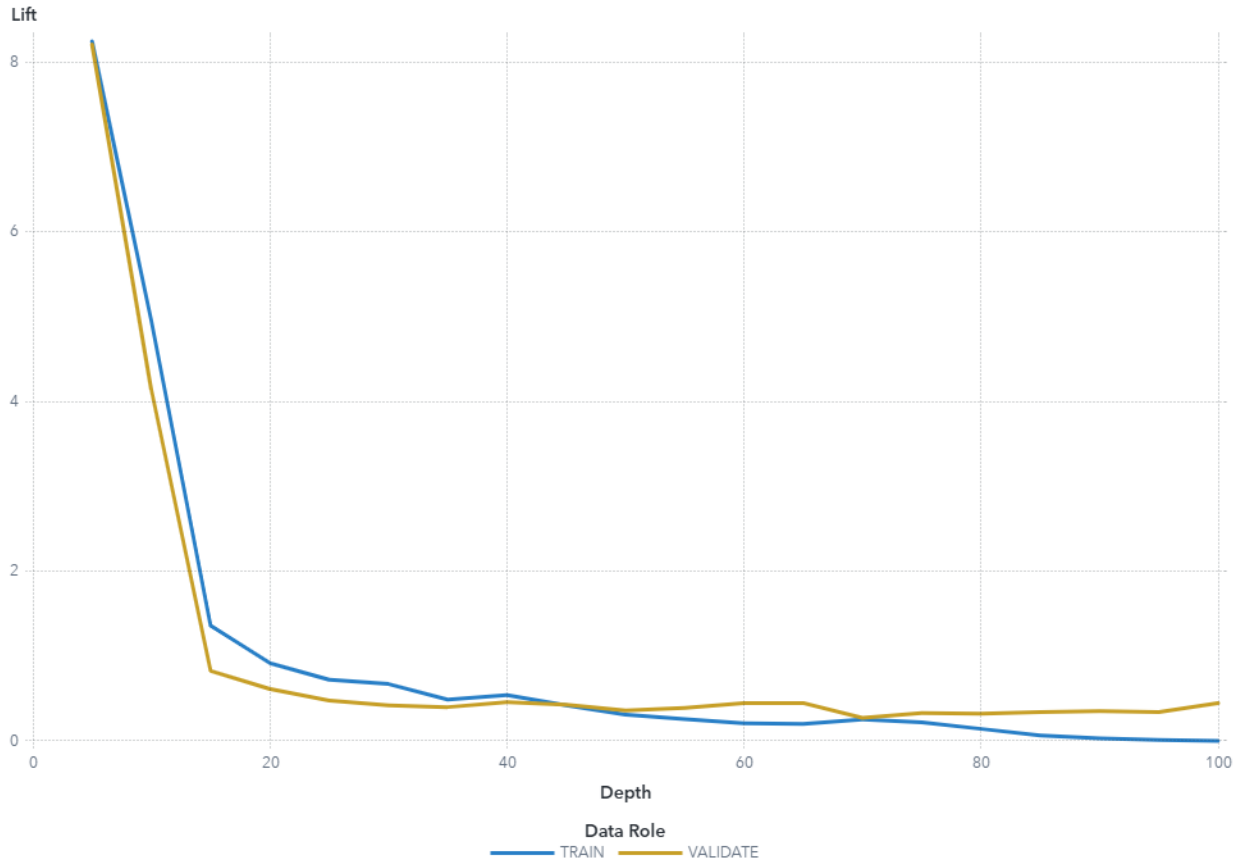
The VALIDATE partition has a Cumulative Lift of 6.17 in the 10% quantile (depth of 10) meaning there are 6.17 times more events in the first two quantiles than expected by random (10% of the total number of events). Because this value is greater than 1, it is better to use your model to identify responders than no model, based on the selected partition.

The TRAIN partition has a Cumulative Lift of 6.6 in the 10% quantile (depth of 10) meaning there are 6.6 times more events in the first two quantiles than expected by random (10% of the total number of events). Because this value is greater than 1, it is better to use your model to identify responders than no model, based on the selected partition.

Cumulative lift is calculated by sorting each partition in descending order by the predicted probability of the target event P_churn1, which represents the predicted probability of the event "1" for the target churn. The data is divided into 20 quantiles (demi-deciles, with 5% of the data in each), and the number of events in each quantile is computed. The cumulative lift for a particular quantile is the ratio of the number of

events across all quantiles up to and including the current quantile to the number of events that would be there at random, or equivalently, the ratio of the cumulative response percentage to the baseline response percentage. The cumulative lift at depth 10 includes the top 10% of the data, which is the first 2 quantiles, which would have 10% of the events at random. Thus, cumulative lift measures how much more likely it is to observe an event in the quantiles than by selecting observations at random.

Lift



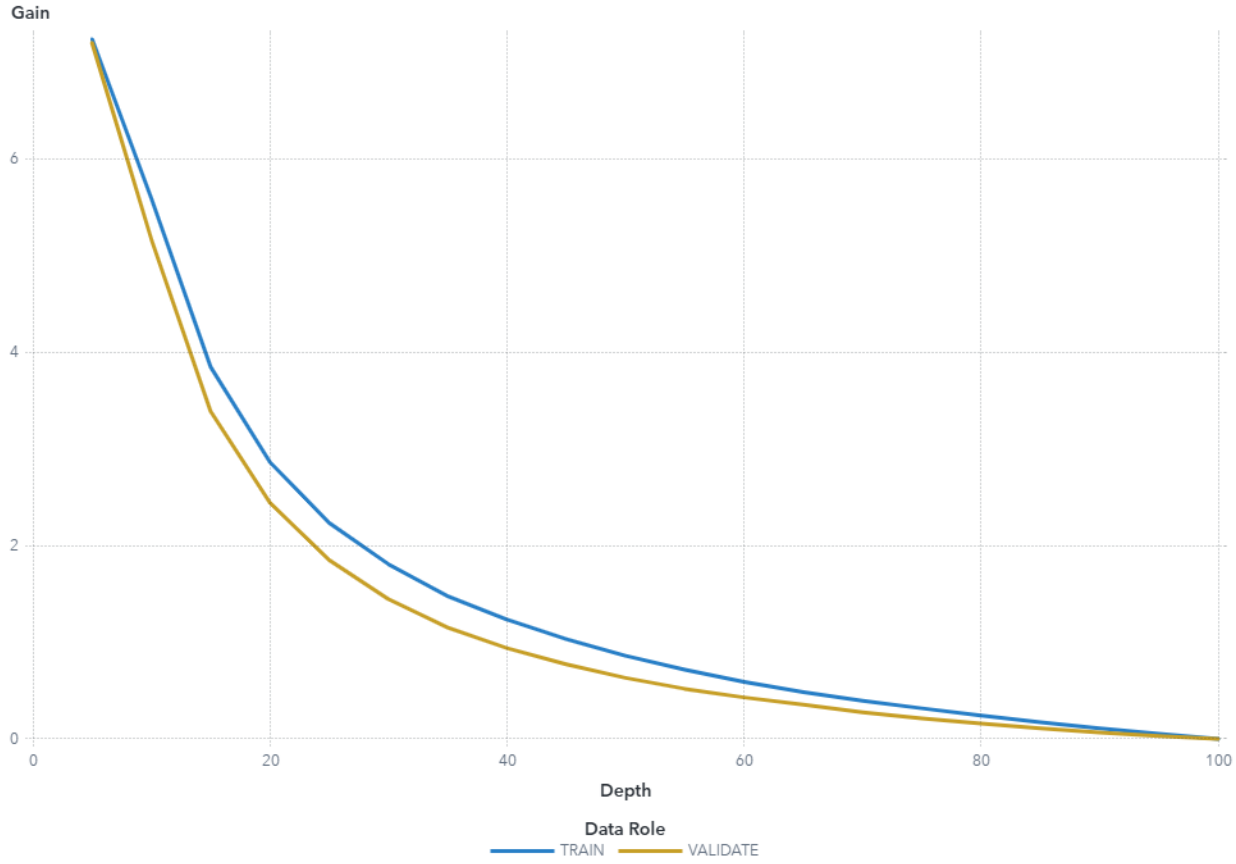
The VALIDATE partition has a Lift of 8.21 in the 5% quantile (depth of 5) meaning there are 8.21 times more events in that quantile than expected by random (5% of the total number of events). Because this value is greater than 1, it is better to use your model to identify responders than no model, based on the selected partition.

The TRAIN partition has a Lift of 8.24 in the 5% quantile (depth of 5) meaning there are 8.24 times more events in that quantile than expected by random (5% of the total number of events). Because this value is greater than 1, it is better to use your model to identify responders than no model, based on the selected partition.

Lift is calculated by sorting each partition in descending order by the predicted probability of the target event P_churn1, which represents the predicted probability of the event "1" for the target churn. The data is divided into 20 quantiles (demi-deciles, with 5% of the data in each), and the number of events in each quantile is computed. Lift is the ratio of the number of events in that quantile to the number of events that would be there at random, or equivalently, the ratio of the response percentage to the baseline response percentage. With 20 quantiles, it is expected that 5% of the events

occur in each quantile. Thus, Lift measures how much more likely it is to observe an event in each quantile than by selecting observations at random.

Gain



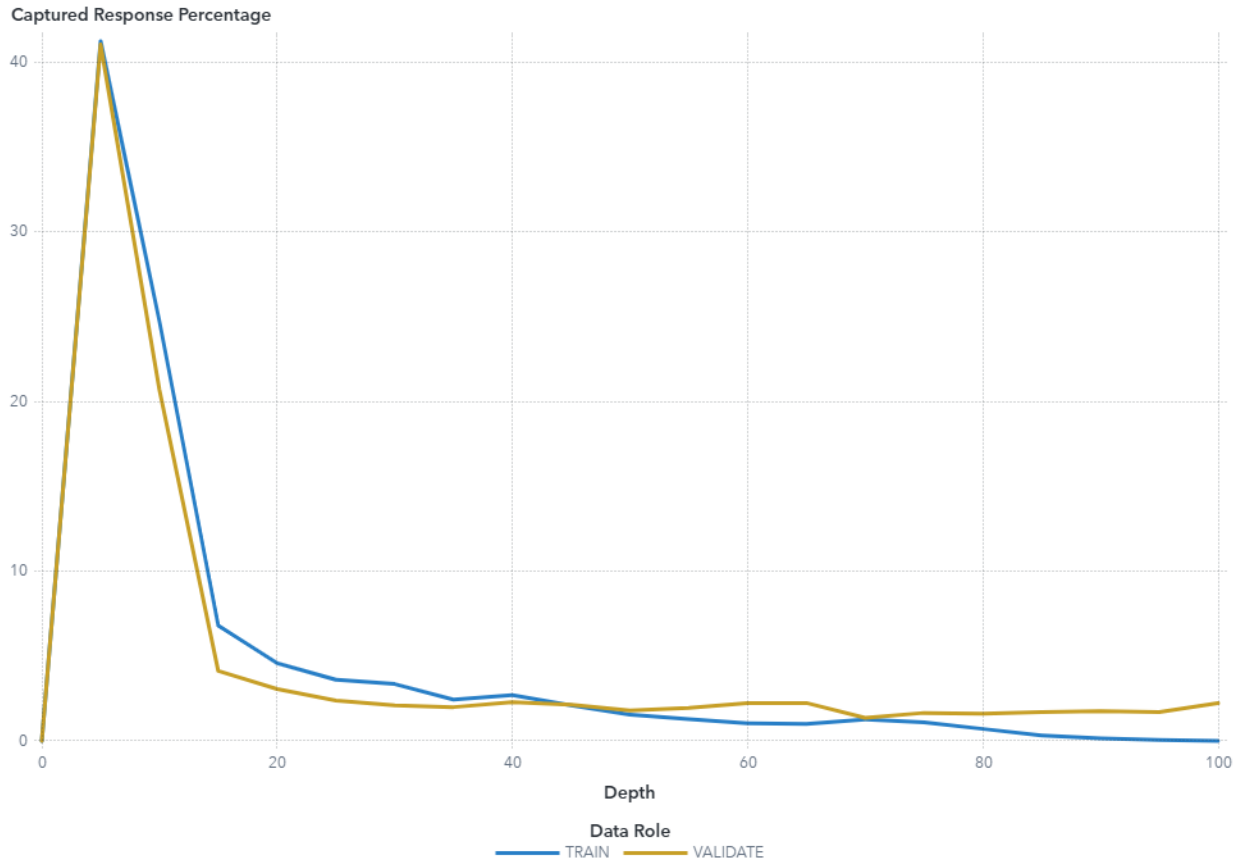
The VALIDATE partition has a Gain of 5.2 at the 10% quantile (depth of 10). Because this value is greater than 0, it is better to use your model to identify responders than no model, based on the selected partition. The best possible value of Gain for this partition at depth 10 is 7.25.

The TRAIN partition has a Gain of 5.6 at the 10% quantile (depth of 10). Because this value is greater than 0, it is better to use your model to identify responders than no model, based on the selected partition. The best possible value of Gain for this partition at depth 10 is 7.24.

Gain is calculated by sorting each partition in descending order by the predicted probability of the target event P_churn1, which represents the predicted probability of the event "1" for the target churn. The data is divided into 20 quantiles (demi-deciles, with 5% of the data in each), and the number of events in each quantile is computed. Gain is a cumulative measure for the quantiles up to an including the current one and is calculated as (number of events in the quantiles) / (number of events expected by random) - 1. With 20 quantiles, it is expected that 5% of the events occur in each

quantile. Note that the value of Gain is the same as the value of Cumulative Lift - 1. If the value of Gain is greater than 0, then your model is better at identifying events than using no model.

Captured Response Percentage

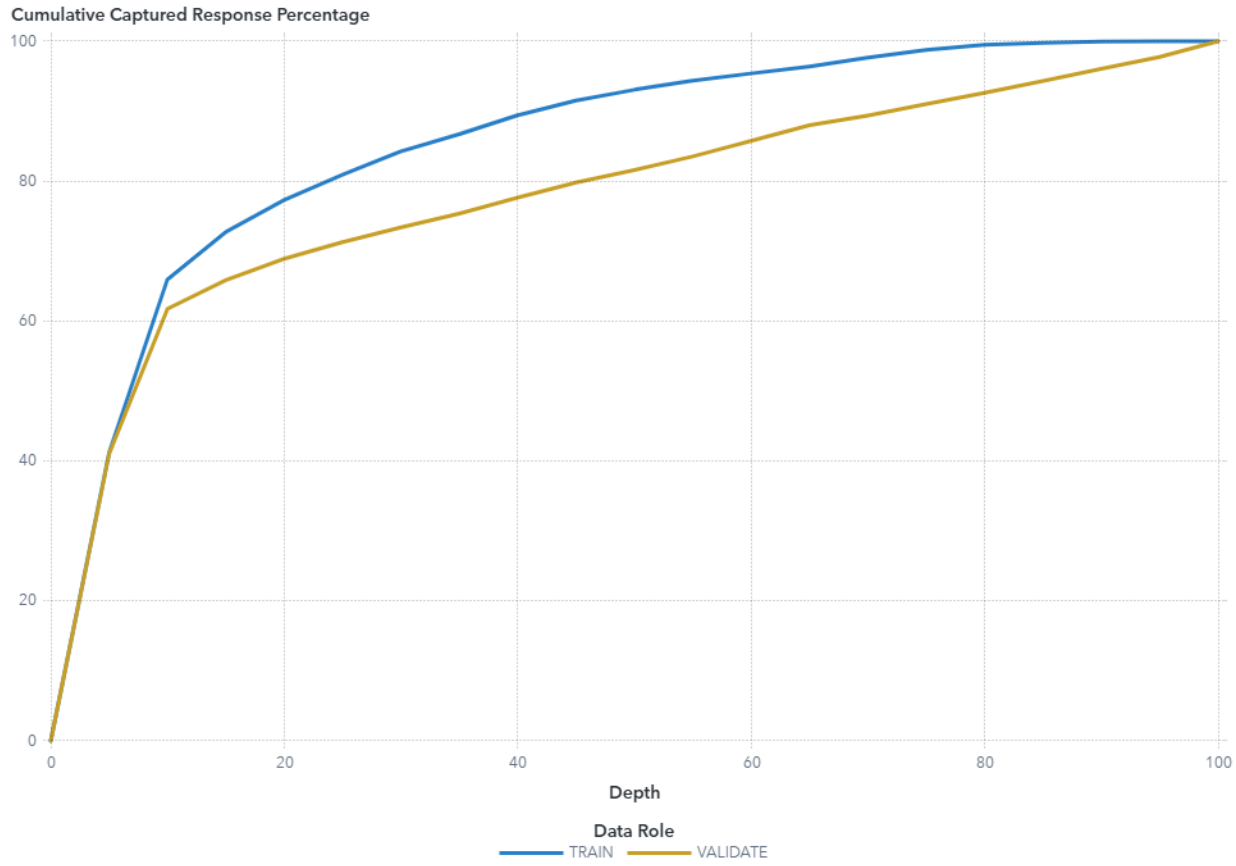


At the 5% quantile (depth of 5), the VALIDATE partition has a Captured response percentage of 41 (compared to the expected value of 5 for no model). The best possible value of Captured response percentage for this partition at depth 5 is 41.23.

At the 5% quantile (depth of 5), the TRAIN partition has a Captured response percentage of 41.2 (compared to the expected value of 5 for no model). The best possible value of Captured response percentage for this partition at depth 5 is 41.22.

Captured response percentage is calculated by sorting each partition in descending order by the predicted probability of the target event P_churn1, which represents the predicted probability of the event "1" for the target churn. The data is divided into 20 quantiles (demi-deciles, with 5% of the data in each), and the number of events in each quantile is computed. Captured response percentage is the percentage of the total number of events that are in that quantile. With no model, it is expected that 5% of the events are in each quantile.

Cumulative Captured Response Percentage



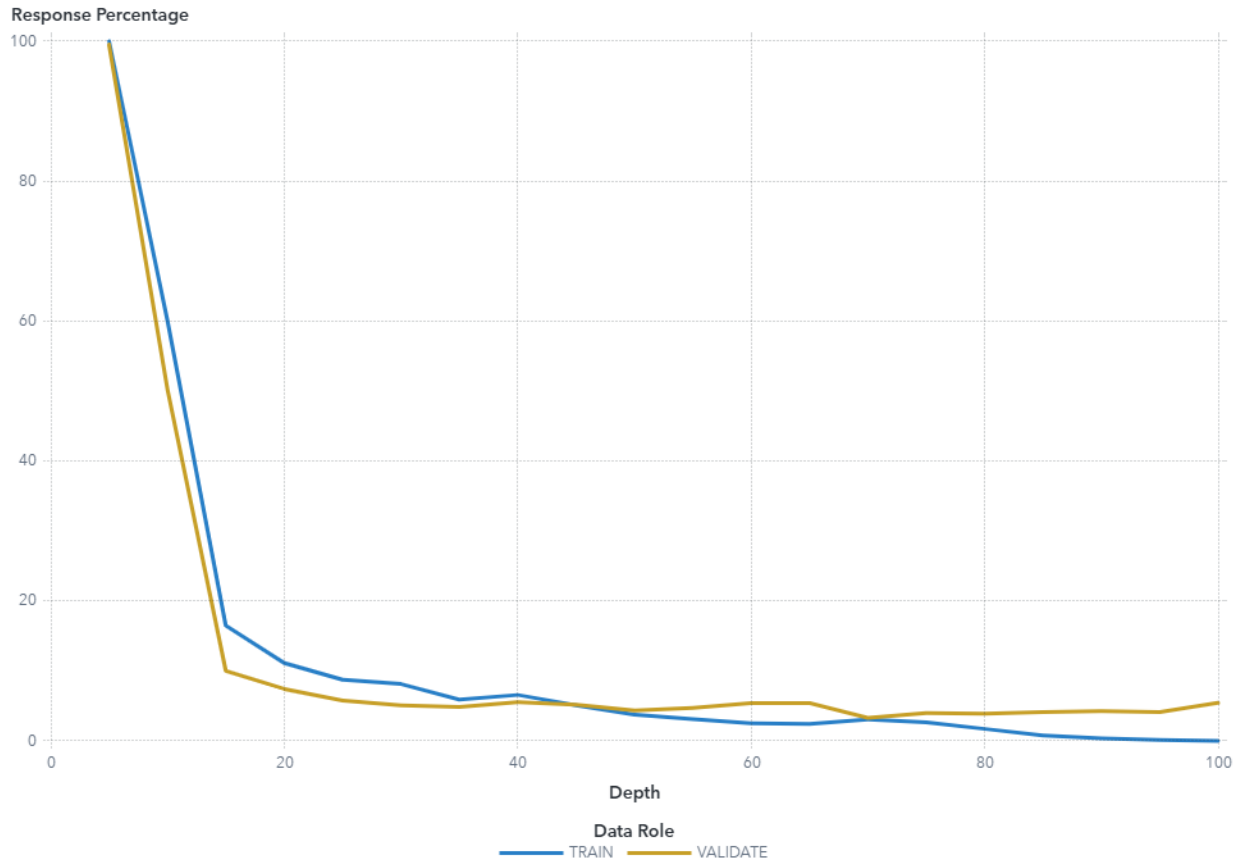
In the top 10% of the data (depth 10), the VALIDATE partition has a Cumulative captured response percentage of 61.7 (compared to the expected value of 10 for no model). The best possible value of Cumulative captured response percentage for this partition at depth 10 is 82.47.

In the top 10% of the data (depth 10), the TRAIN partition has a Cumulative captured response percentage of 66 (compared to the expected value of 10 for no model). The best possible value of Cumulative captured response percentage for this partition at depth 10 is 82.45.

Cumulative captured response percentage is calculated by sorting each partition in descending order by the predicted probability of the target event P_churn1, which represents the predicted probability of the event "1" for the target churn. The data is divided into 20 quantiles (demi-deciles, with 5% of the data in each), and the number of events in each quantile is computed. The cumulative captured response percentage for a particular quantile is the percentage of the total number of events that are in the quantiles up to and including the current quantile. With no model, it is expected that 5%

of the events are in each quantile, so the cumulative captured response percentage at depth 10 would be 10%.

Response Percentage

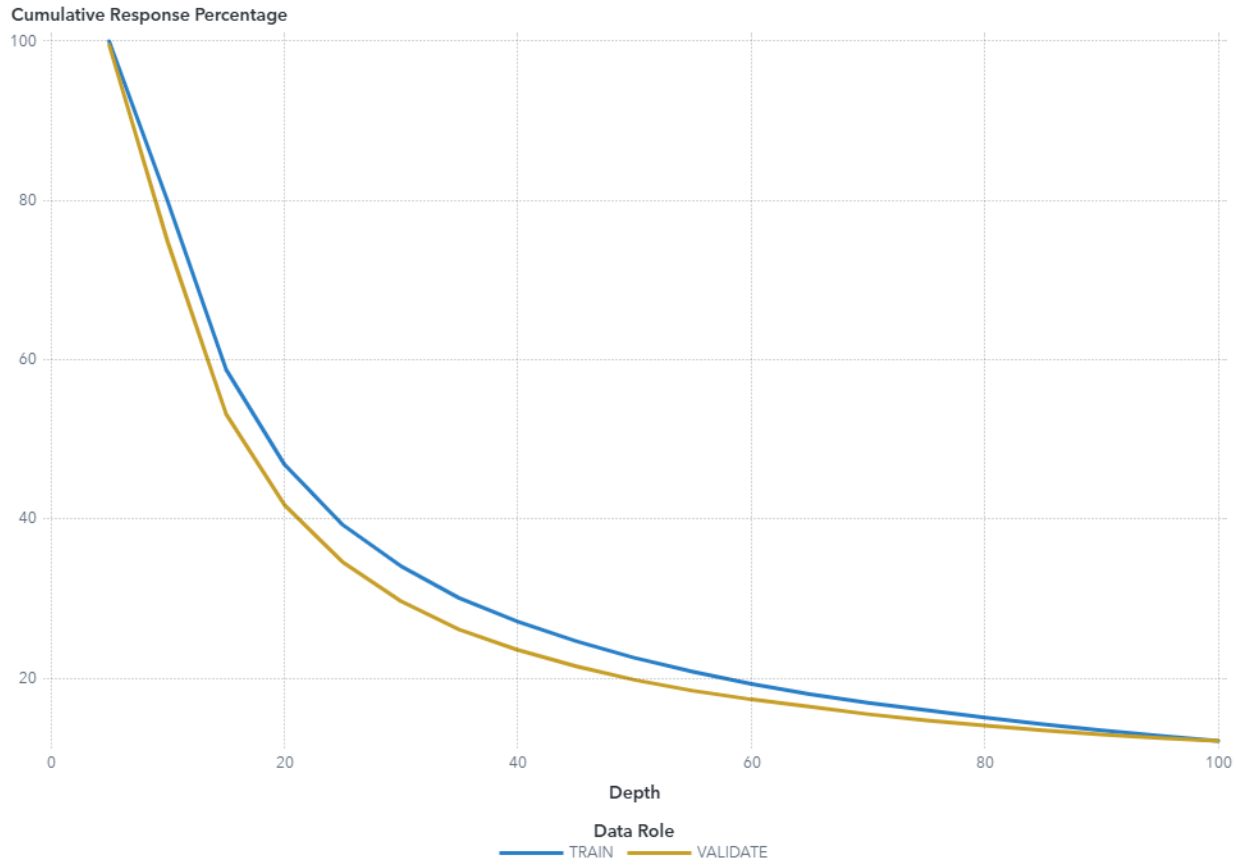


At the 5% quantile (depth of 5), the VALIDATE partition has a Response percentage of 99.5. The best possible value of Response percentage for this partition at depth 5 is 100.

At the 5% quantile (depth of 5), the TRAIN partition has a Response percentage of 100. The best possible value of Response percentage for this partition at depth 5 is 100.

Response percentage is calculated by sorting each partition in descending order by the predicted probability of the target event P_churn1, which represents the predicted probability of the event "1" for the target churn. The data is divided into 20 quantiles (demi-deciles, with 5% of the data in each), and the number of events in each quantile is computed. Response percentage is the percentage of observations that are events in that quantile. With no model, it is expected that the response percentage is constant across quantiles, 100*overall-event-rate. This is also called the baseline response percentage.

Cumulative Response Percentage

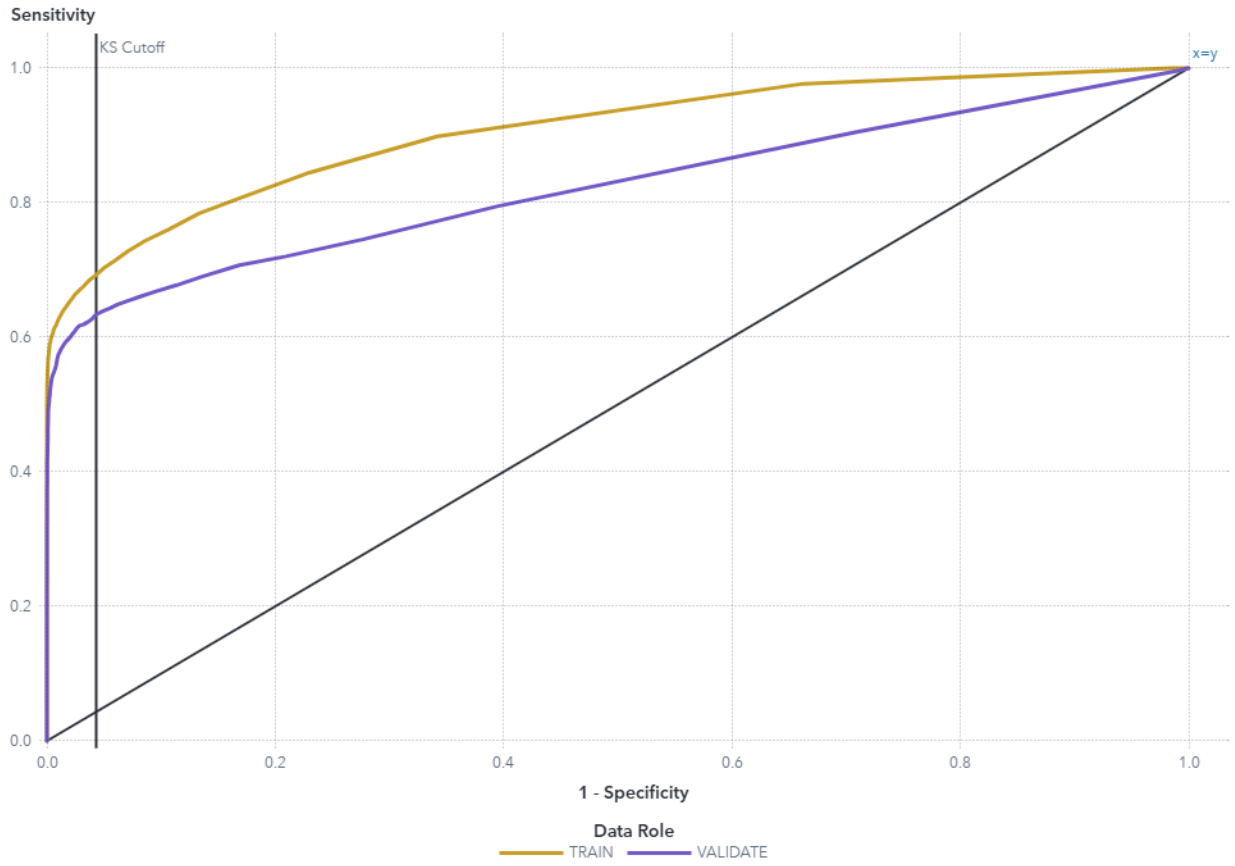


In the top 10% of the data (depth 10), the VALIDATE partition has a Cumulative response percentage of 74.9. The best possible value of Cumulative response percentage for this partition at depth 10 is 100.

In the top 10% of the data (depth 10), the TRAIN partition has a Cumulative response percentage of 80. The best possible value of Cumulative response percentage for this partition at depth 10 is 100.

Cumulative response percentage is calculated by sorting in descending order each partition of the data by the predicted probability of the target event P_churn1, which represents the predicted probability of the event "1" for the target churn. The data is divided into 20 quantiles (demi-deciles, with 5% of the data in each), and the number of events in each quantile is computed. The cumulative response percentage for a particular quantile is the percentage of observations that are events in the quantiles up to and including the current quantile. With no model, it is expected that the response percentage is constant across quantiles, 100*overall-event-rate. This is also called the baseline response percentage.

ROC



The ROC curve is a plot of sensitivity (the true positive rate) against 1-specificity (the false positive rate), which are both measures of classification based on the confusion matrix. These measures are calculated at various cutoff values. To help identify the best cutoff to use when scoring your data, the KS Cutoff reference line is drawn at the value of 1-specificity where the greatest difference between sensitivity and 1-specificity is observed for the VALIDATE partition. The KS Cutoff line is drawn at the cutoff value 0.18, where the 1-specificity value is 0.043 and the sensitivity value is 0.633.

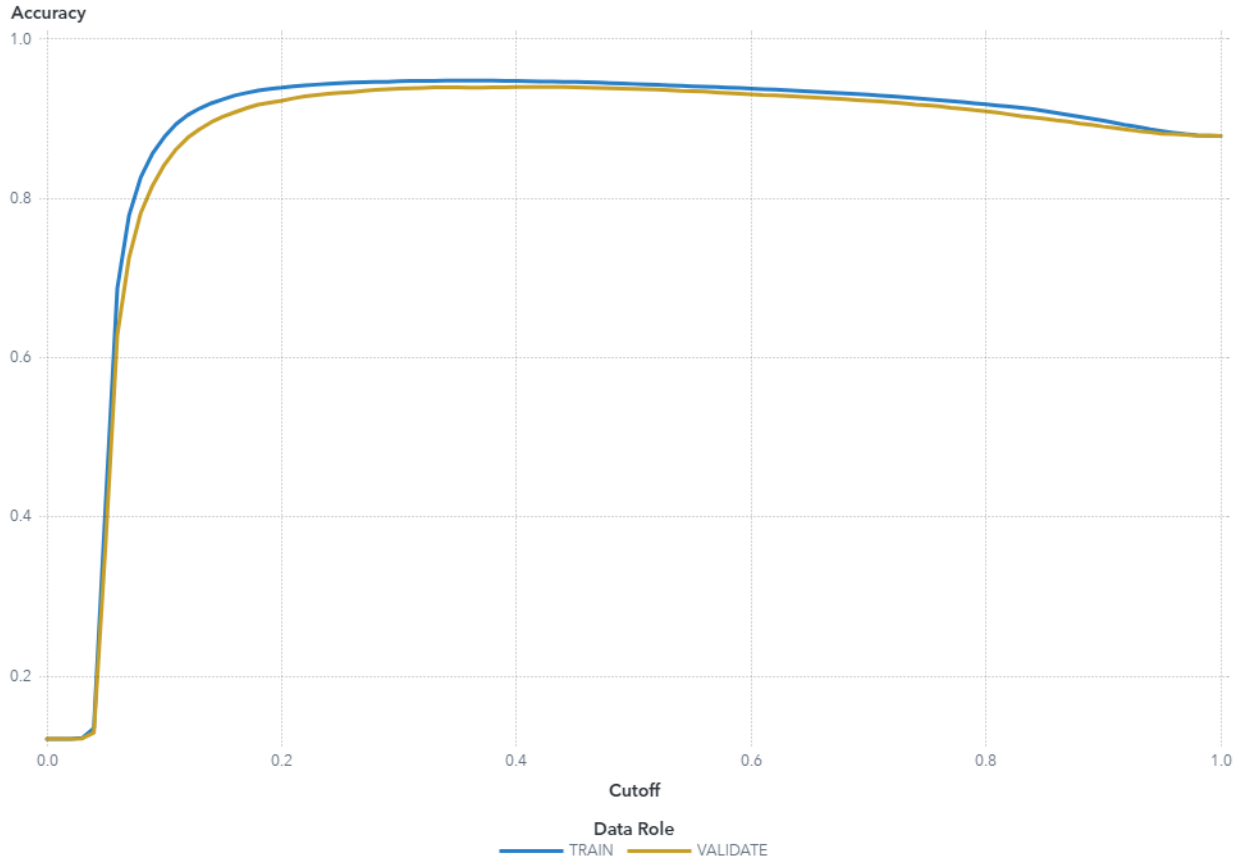
Cutoff values range from 0 to 1, inclusive, in increments of 0.01. At each cutoff value, the predicted target classification is determined by whether P_churn1, which is the predicted probability of the event "1" for the target churn, is greater than or equal to the cutoff value. When P_churn1 is greater than or equal to the cutoff value, then the predicted classification is the event, otherwise it is a non-event.

The confusion matrix for each cutoff value contains four cells that display the true positives for events that are correctly classified (TP), false positives for non-events that are classified as events (FP), false negatives for events that are classified as non-

events (FN), and true negatives for non-events that are classified as non-events (TN). True negatives include non-event classifications that specify a different non-event. Sensitivity is calculated as TP / (TP + FN). Specificity, the true negative rate, is calculated as TN / (TN + FP), so 1-specificity is FP / (TN + FP). The values of sensitivity and 1-specificity are plotted at each cutoff value.

A ROC curve that rapidly approaches the upper-left corner of the graph, where the difference between sensitivity and 1-specificity is the greatest, indicates a more accurate model. A diagonal line where sensitivity = 1-specificity indicates a random model.

Accuracy

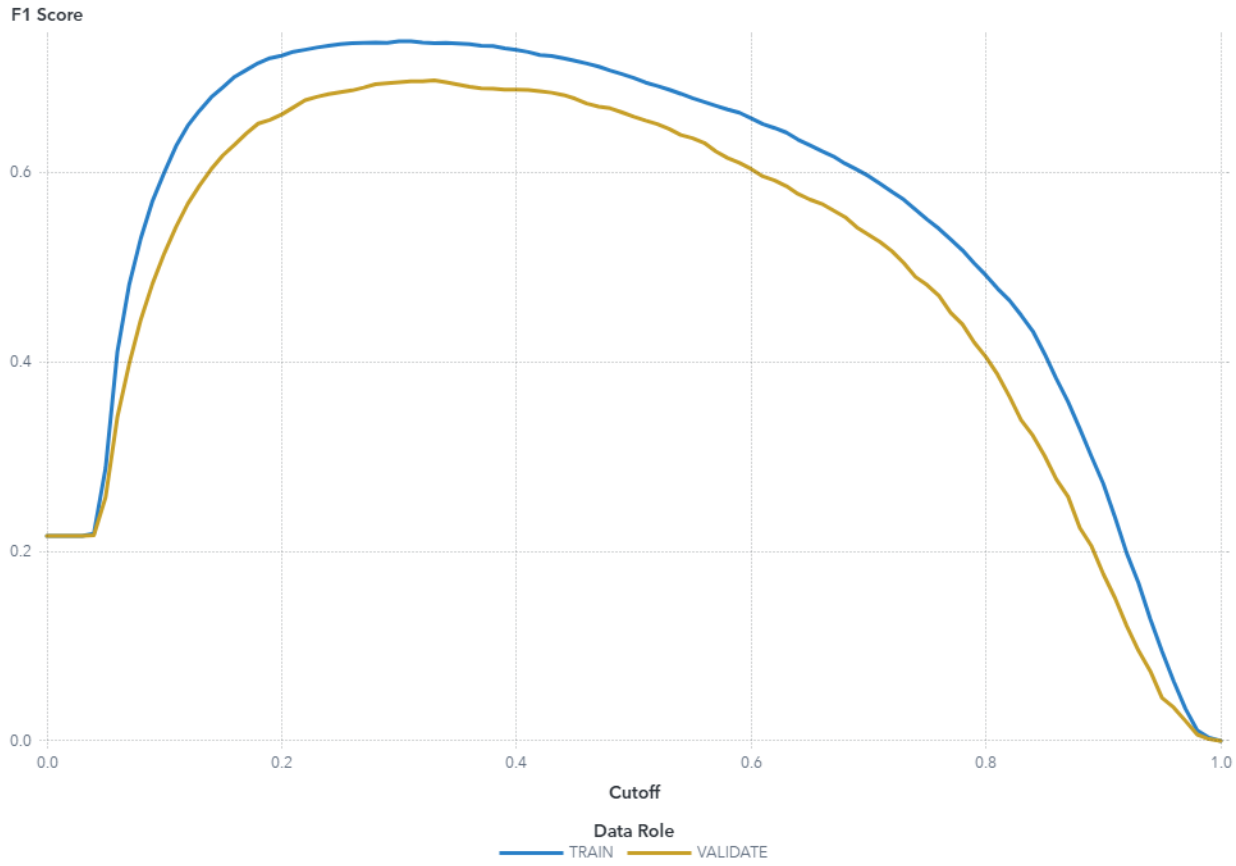


For this model, the accuracy in the TRAIN partition at the cutoff of 0.5 is 0.944.

For this model, the accuracy in the VALIDATE partition at the cutoff of 0.5 is 0.938.

Accuracy is the proportion of observations that are correctly classified as either an event or non-event, calculated at various cutoff values. Cutoff values range from 0 to 1, inclusive, in increments of 0.01. At each cutoff value, the predicted target classification is determined by whether P_churn1, which is the predicted probability of the event "1" for the target churn, is greater than or equal to the cutoff value. When P_churn1 is greater than or equal to the cutoff value, then the predicted classification is the event, otherwise it is a non-event. When the predicted classification and the actual classification are both events (true positives) or both non-events (true negatives), the observation is correctly classified. If the predicted classification and actual classification disagree, then the observation is incorrectly classified. Accuracy is calculated as (true positives + true negatives) / (total observations).

F1 Score



For this model, the F1 score in the TRAIN partition at the cutoff of 0.5 is 0.7.

For this model, the F1 score in the VALIDATE partition at the cutoff of 0.5 is 0.659.

The F1 score combines the measures of precision and recall (or sensitivity), which are measures of classification based on the confusion matrix that are calculated at various cutoff values. Cutoff values range from 0 to 1, inclusive, in increments of 0.01. At each cutoff value, the predicted target classification is determined by whether P_churn1, which is the predicted probability of the event "1" for the target churn, is greater than or equal to the cutoff value. When P_churn1 is greater than or equal to the cutoff value, then the predicted classification is the event, otherwise it is a non-event.

The confusion matrix for each cutoff value contains four cells that display the true positives for events that are correctly classified (TP), false positives for non-events that are classified as events (FP), false negatives for events that are classified as non-events (FN), and true negatives for non-events that are classified as non-events (TN). True negatives include non-event classifications that specify a different non-event.

Precision is calculated as TP / (TP + FP), and recall (or sensitivity) is calculated as TP / (TP + FN). The F1 score is calculated as 2*Precision*Recall / (Precision + Recall), which is the harmonic mean of Precision and Recall. Larger F1 scores indicate a more accurate model.

Fit Statistics

Target Name	Data Role	Partition Indicator	Formatted Partition
churn	TRAIN	1	1
churn	VALIDATE	0	0

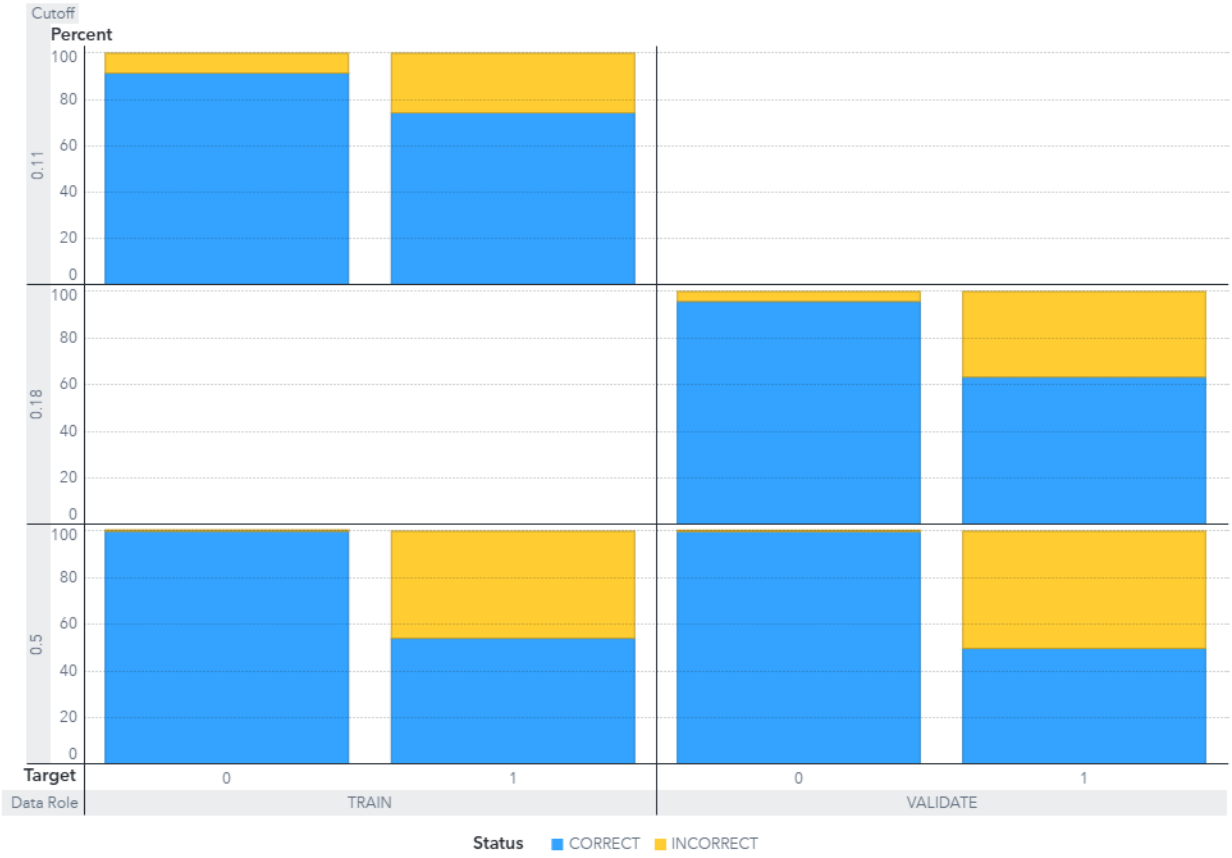
Number of Observations	Average Squared Error	Divisor for ASE	Root Average Squared Error
39,590	0.0499	39,590	0.2233
16,967	0.0570	16,967	0.2388

Misclassification Rate	Multi-Class Log Loss	KS (Youden)	Area Under ROC
0.0561	0.1976	0.6573	0.9057
0.0624	0.2250	0.5906	0.8234

Gini Coefficient	Gamma	Tau	KS Cutoff
0.8113	0.8482	0.1730	0.1100
0.6468	0.6954	0.1379	0.1800

KS at User-Specified Cutoff	Misclassification Rate at KS Cutoff (Event)	Misclassification Rate (Event)
0.5401	0.1067	0.0561
0.4958	0.0820	0.0624

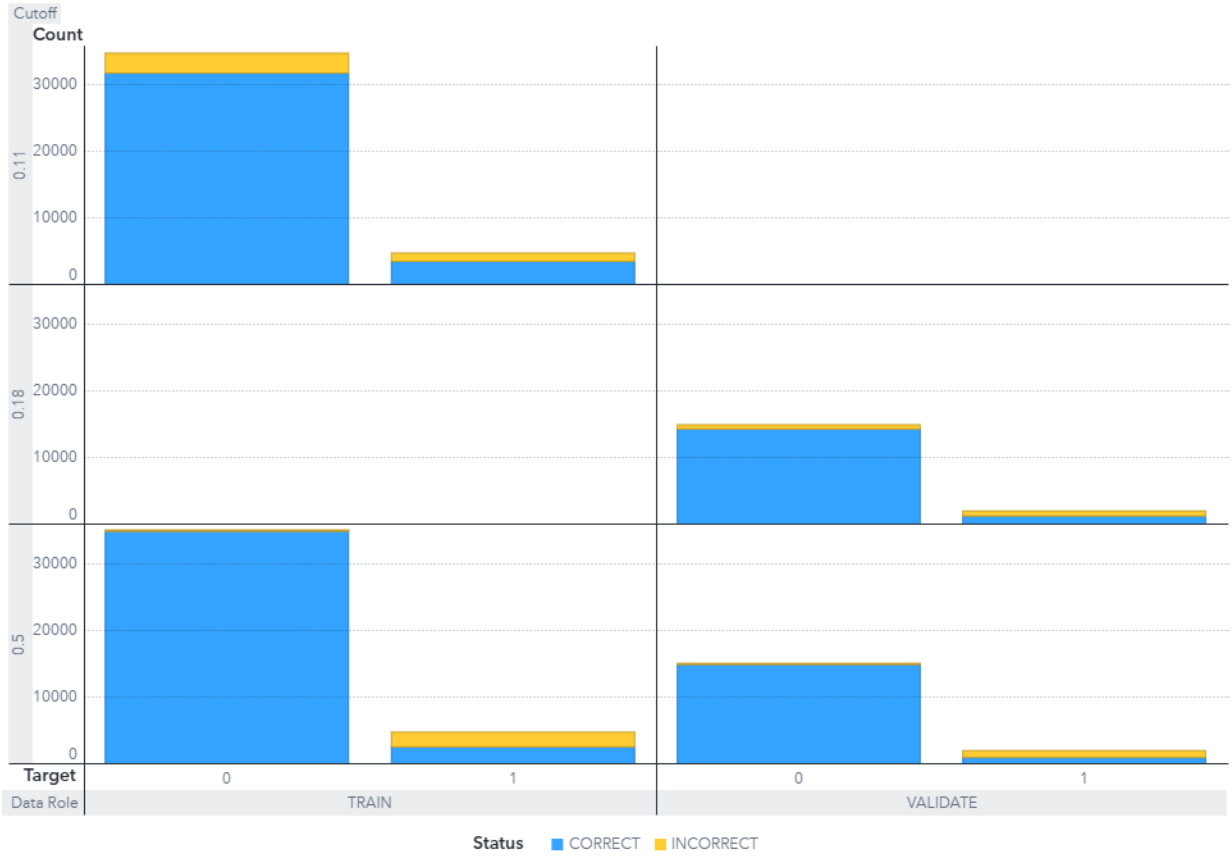
Percentage Plot



The Event Classification report is a visual representation of the confusion matrix at various cutoff values for each partition. The classification cutoffs used in the plot are the default (0.5) and these KS cutoff values for existing partitions: 0.11 (TRAIN), 0.18 (VALIDATE).

For this data, for the bar corresponding to the event level of churn, " 1", the segment of the bar colored as "CORRECT" corresponds to true positives.

Count Plot



The Event Classification report is a visual representation of the confusion matrix at various cutoff values for each partition. The classification cutoffs used in the plot are the default (0.5) and these KS cutoff values for existing partitions: 0.11 (TRAIN), 0.18 (VALIDATE).

For this data, for the bar corresponding to the event level of churn, " 1", the segment of the bar colored as "CORRECT" corresponds to true positives.

Table

Cutoff	Cutoff Source	Target Name	Response
0.1100	KS	churn	CORRECT
0.1100	KS	churn	INCORRECT
0.1100	KS	churn	CORRECT
0.1100	KS	churn	INCORRECT
0.1800	KS	churn	CORRECT
0.1800	KS	churn	INCORRECT
0.1800	KS	churn	CORRECT
0.1800	KS	churn	INCORRECT
0.5000	Default	churn	CORRECT
0.5000	Default	churn	INCORRECT
0.5000	Default	churn	CORRECT
0.5000	Default	churn	INCORRECT

Event	Value	Training Frequency	Validation Frequency
1	True Positive	3,570	
1	False Negative	1,233	
0	True Negative	31,796	
0	False Positive	2,991	
1	True Positive		1,304
1	False Negative		755
0	True Negative		14,271
0	False Positive		637
1	True Positive	2,596	1,024
1	False Negative	2,207	1,035
0	True Negative	34,772	14,885
0	False Positive	15	23

Test Frequency	Training Percentage	Validation Percentage	Test Percentage
	74.3285		
	25.6715		
	91.4020		
	8.5980		
		63.3317	
		36.6683	
		95.7271	
		4.2729	
	54.0496	49.7329	
	45.9504	50.2671	
	99.9569	99.8457	
	0.0431	0.1543	

Properties

Property Name	Property Value
atAppendLookup	false
atCreateHistory	false
atHistoryLibUri	
atHistoryTblName	
atLeaveAutotuneOn	false
atLookupTableUri	
atMaxBayes	100
atMaxEval	50
atMaxIter	5
atMaxTime	60
atObjectiveInt	ASE
atObjectiveNom	KS
atPopSize	10
atSampleSize	50
atSearchMethod	GA
atTrainProp	0.7000
atUpdateProperties	false
atUseLookup	false
atValidFold	5
atValidMethod	PARTITION
atValidProp	0.3000
atintervalBins	true
atintervalBinsInit	50
atintervalBinsLB	20
atintervalBinsUB	100
atleafSize	false
atleafSizeInit	5
atleafSizeLB	1

Property Name	Property Value
atleafSizeUB	100
atmaxDepth	true
atmaxDepthInit	20
atmaxDepthLB	1
atmaxDepthUB	29
atmaxTrees	true
atmaxTreesInit	100
atmaxTreesLB	20
atmaxTreesUB	150
attrainFraction	true
attrainFractionInit	0.6000
attrainFractionLB	0.1000
attrainFractionUB	0.9000
atvarsToTry	true
atvarsToTryInit	100
atvarsToTryLB	1
atvarsToTryUB	100
autotune_enabled	false
binaryProbCutoff	0.5000
codeLocation	mlearning
criterionMethod	IGR
dataMiningVersion	V2024.03
defaultVarsPerTree	true
exactPctlLift	true
explainFidelity	false
explainInfo	false
fullDatasetReconstitution	false
iCriterionMethod	VARIANCE

Property Name	Property Value
icePlots	false
intBinMethod	QUANTILE
intervalBins	50
leafProp	0.0001
leafSize	5
leafSpec	COUNT
loh	0
maxBranch	2
maxCategories	128
maxDepth	20
maxNumShapVars	20
maxTrees	100
minUseInSearch	1
missingValue	USEINSEARCH
nBins	50
pdNumImportantInputs	5
pdObsSamples	1,000
pdPlots	false
performKernelShap	false
performLime	false
performVI	false
seed	12,345
seedId	12,345
specifyRows	RANDOM
templateRevision	4
train	true
trainFraction	0.6000
truncateLl	5

Property Name	Property Value
truncateUI	95
userProbCutoff	false
varsToTry	100
voteMethod	PROBABILITY

Output

The FOREST Procedure

Model Information	
Number of Trees	100
Number of Variables Per Split	11
Seed	12345
Bootstrap Percentage	60
Number of Bins	50
Number of Input Variables	107
Maximum Number of Tree Nodes	907
Minimum Number of Tree Nodes	429
Maximum Number of Branches	2
Minimum Number of Branches	2
Maximum Depth	20
Minimum Depth	20
Maximum Number of Leaves	454
Minimum Number of Leaves	215
Maximum Leaf Size	15500
Minimum Leaf Size	5
OOB Misclassification Rate	0.06319778
Average Number of Leaves	354.42

	Training	Validation	Total
Number of Observations Read	39590	16967	56557
Number of Observations Used	39590	16967	56557

Variable Importance			
Variable	Importance	Std Dev Importance	Relative Importance
curr_days_susp	427.66	217.44	1.0000
ever_days_over_plan	251.93	139.23	0.5891
avg_days_susp	187.78	125.84	0.4391
handset_age_grp	162.94	115.77	0.3810
LOG_MB_Data_Usg_M05	116.52	118.66	0.2725
delinq_indicator	104.49	72.4021	0.2443
REP_seconds_of_data_norm	92.8827	72.8287	0.2172
LOG_MB_Data_Usg_M04	84.7577	88.6178	0.1982
pymts_late_ltd	83.6371	63.4109	0.1956
ever_times_over_plan	72.4270	50.1873	0.1694
times_susp	69.9770	60.6619	0.1636
LOG_MB_Data_Usg_M06	68.0744	63.0929	0.1592
LOG_MB_Data_Usg_M07	59.5554	59.6219	0.1393
calls_care_ltd	59.0403	43.8874	0.1381
LOG_MB_Data_Usg_M08	48.5986	35.1794	0.1136
IMP_seconds_of_data_log	45.9480	45.7979	0.1074
IMP_LOG_MB_Data_Usg_M09	43.9706	37.7032	0.1028
wrk_orders	37.9000	28.5941	0.0886
IMP_REP_mou_onnet_pct_MOM	29.1655	32.1916	0.0682
REP_calls_out_pk	22.1362	27.1455	0.0518
days_openwrkorders	22.0787	18.5353	0.0516
billing_cycle	21.2159	8.7433	0.0496
REP_lifetime_value	15.8318	11.7369	0.0370
call_category_1	15.2429	7.4475	0.0356
REP_calls_total	14.2218	12.9029	0.0333
region	13.7371	7.7613	0.0321
REP_mb_data_usg_roamm03	12.6786	11.7614	0.0296
rfm_score	12.1717	12.8389	0.0285
bill_data_usg_m09	11.7621	9.2289	0.0275
REP_bill_data_usg_m03	11.5867	9.7920	0.0271
REP_tot_mb_data_curr	11.4418	7.7043	0.0268
REP_mb_data_usg_roamm01	11.3851	9.5645	0.0266
REP_bill_data_usg_m06	11.3160	9.1159	0.0265
REP_mb_data_usg_m02	11.2148	10.0663	0.0262
REP_mb_data_usg_m01	11.1920	11.4176	0.0262
REP_mb_data_usg_roamm02	10.6743	10.7130	0.0250
IMP_REP_mou_total_pct_MOM	10.6316	12.5315	0.0249
product_plan_desc	10.6243	5.7954	0.0248
REP_mb_data_usg_m03	10.3635	10.0235	0.0242
REP_voice_tot_bill_mou_curr	10.3164	6.7843	0.0241
REP_calls_in_pk	9.9240	7.2840	0.0232
REP_calls_in_offpk	9.8382	7.5542	0.0230
mb_inclplan	9.4809	5.4497	0.0222
last_rep_sat_score	9.1668	6.2645	0.0214
REP_calls_out_offpk	8.8644	6.1990	0.0207
Est_HH_Income	8.8424	5.6375	0.0207
calls_TS_acct	7.8927	5.4655	0.0185
times_delinq	7.6461	6.6788	0.0179
count_of_suspensions_6m	7.1898	5.3864	0.0168
IMP_cs_med_home_value	7.1225	5.4933	0.0167
IMP_cs_other	7.0673	5.2045	0.0165
IMP_REP_mb_data_ndist_mo6m	6.9990	6.9604	0.0164
num_tsupcomplnts	6.8625	6.0365	0.0160
resolved_complnts	6.8513	5.6720	0.0160
handset	6.7062	5.4357	0.0157
IMP_cs_pct_home_owner	6.3949	4.4098	0.0150
unsolv_tsupcomplnt	6.3670	5.6845	0.0149
IMP_cs_caucasian	6.3291	4.6465	0.0148
acct_age	6.2329	4.8610	0.0146
forecast_region	6.2075	4.6529	0.0145
IMP_REP_data_device_age	6.1968	4.0329	0.0145
IMP_cs_afr_amer	6.1956	4.4998	0.0145
IMP_cs_ttl_mdage	6.1532	5.0501	0.0144
IMP_cs_hispanic	6.1450	4.4915	0.0144
bill_data_usg_tot	6.0017	4.5984	0.0140
IMP_nbr_data_cdrs	5.9738	5.2210	0.0140
IMP_cs_ttl_male	5.9722	4.1298	0.0140
zip_long	5.9677	4.7028	0.0140
IMP_cs_ttl_hhlds	5.8452	3.9151	0.0137
IMP_cs_ttl_female	5.7926	4.1591	0.0135
IMP_cs_ttl_pop	5.7445	3.9678	0.0134
zipcode_primary	5.3745	4.3796	0.0126
IMP_avg_arpu_3m	5.3493	4.3563	0.0125
zip_lat	5.3211	4.0823	0.0124
REP_tot_mb_data_roam_curr	5.3053	5.5696	0.0124
IMP_tot_voice_chrgs_curr	5.1314	4.2814	0.0120
equip_age	5.1276	3.8279	0.0120
open_tsupcomplnts	4.4049	4.4632	0.0103
IMP_avg_data_chrgs_3m	4.0511	3.8208	0.0095
sales_channel	3.5135	2.9516	0.0082
lifestage	3.1787	2.9471	0.0074
credit_class	3.1460	2.9080	0.0074
nbr_contracts_ltd	2.9050	3.1335	0.0068
IMP_tot_drpd_pr1	2.8212	3.3206	0.0066
IMP_cs_ttl_urban	2.7483	2.4876	0.0064
IMP_cs_ttl_rural	2.7259	3.0840	0.0064
IMP_avg_data_prem_chrgs_3m	2.6744	3.0769	0.0063
calls_care_acct	2.6682	2.9275	0.0062
nbr_contacts	2.6136	3.0704	0.0061
IMP_avg_overage_chrgs_3m	2.1914	3.1329	0.0051
IMP_tot_overage_chgs	1.9389	2.4595	0.0045
IMP_data_prem_chrgs_curr	1.6062	2.5262	0.0038
calls_care_6mavg_acct	1.1947	2.0061	0.0028
price_mention	1.0136	1.9355	0.0024
mfg_apple	0.8890	1.6026	0.0021
res_calls_6mavg_acct	0.7910	1.9872	0.0018
calls_care_3mavg_acct	0.7365	1.4809	0.0017
res_calls_3mavg_acct	0.6745	2.1683	0.0016
mfg_samsung	0.6533	1.4904	0.0015
mfg_nokia	0.4557	1.2543	0.0011
service_mention	0.4415	1.1833	0.0010
network_mention	0.4084	1.1281	0.0010
mfg_motorola	0.3832	1.0924	0.0009
mfg_lg	0.3761	0.9775	0.0009
upsell_xsell	0.3612	1.3175	0.0008
rp_pooled_ind	0.3586	1.0102	0.0008
mfg_htc	0.2616	0.7174	0.0006

Fit Statistics										
Number of Trees	OOB Average Square Error	Training Average Square Error	Validation Average Square Error	OOB Misclassification Rate	Training Misclassification Rate	Validation Misclassification Rate	OOB Log Loss	Training Log Loss	Validation Log Loss
1	0.0813	0.0688	0.0824	0.0943	0.0801	0.0965	0.726	0.491	0.720
2	0.0761	0.0582	0.0689	0.0893	0.0676	0.0822	0.574	0.238	0.313
3	0.0703	0.0543	0.0630	0.0820	0.0613	0.0705	0.450	0.213	0.257
4	0.0684	0.0537	0.0623	0.0785	0.0599	0.0698	0.378	0.210	0.249
5	0.0675	0.0534	0.0615	0.0775	0.0607	0.0704	0.337	0.208	0.241
6	0.0658	0.0530	0.0609	0.0748	0.0603	0.0689	0.300	0.207	0.239
7	0.0645	0.0527	0.0606	0.0730	0.0595	0.0679	0.275	0.207	0.238
8	0.0637	0.0527	0.0606	0.0722	0.0593	0.0685	0.261	0.207	0.237
9	0.0627	0.0522	0.0600	0.0711	0.0591	0.0674	0.249	0.205	0.235
10	0.0620	0.0523	0.0599	0.0699	0.0589	0.0671	0.243	0.206	0.234
11	0.0621	0.0527	0.0601	0.0701	0.0594	0.0674	0.241	0.207	0.234
12	0.0613	0.0520	0.0596	0.0685	0.0583	0.0670	0.239	0.205	0.232
13	0.0611	0.0520	0.0594	0.0682	0.0583	0.0669	0.238	0.205	0.231
14	0.0610	0.0520	0.0593	0.0686	0.0583	0.0664	0.238	0.205	0.231
15	0.0608	0.0521	0.0593	0.0682	0.0583	0.0663	0.236	0.205	0.231
16	0.0607	0.0520	0.0592	0.0680	0.0579	0.0662	0.235	0.205	0.231
17	0.0606	0.0520	0.0592	0.0677	0.0582	0.0664	0.235	0.205	0.231
18	0.0604	0.0518	0.0590	0.0674	0.0579	0.0663	0.234	0.204	0.230
19	0.0603	0.0517	0.0589	0.0672	0.0578	0.0662	0.234	0.204	0.230
20	0.0602	0.0518	0.0590	0.0669	0.0580	0.0660	0.234	0.204	0.230
21	0.0602	0.0517	0.0590	0.0667	0.0579	0.0663	0.234	0.204	0.230
22	0.0600	0.0515	0.0588	0.0667	0.0578	0.0658	0.234	0.203	0.230
23	0.0598	0.0514	0.0587	0.0665	0.0576	0.0650	0.233	0.203	0.229
24	0.0596	0.0512	0.0584	0.0661	0.0575	0.0649	0.233	0.202	0.229
25	0.0596	0.0512	0.0585	0.0661	0.0574	0.0650	0.233	0.202	0.229
26	0.0594	0.0511	0.0583	0.0656	0.0572	0.0647	0.232	0.202	0.228
27	0.0594	0.0510	0.0582	0.0656	0.0571	0.0647	0.232	0.202	0.228
28	0.0590	0.0507	0.0579	0.0651	0.0568	0.0647	0.231	0.201	0.228
29	0.0591	0.0508	0.0580	0.0653	0.0569	0.0643	0.231	0.201	0.228
30	0.0591	0.0508	0.0580	0.0654	0.0570	0.0646	0.231	0.201	0.228
31	0.0590	0.0507	0.0579	0.0652	0.0567	0.0641	0.231	0.201	0.228
32	0.0588	0.0506	0.0577	0.0649	0.0566	0.0643	0.231	0.201	0.227
33	0.0586	0.0504	0.0576	0.0646	0.0563	0.0636	0.230	0.200	0.227
34	0.0585	0.0503	0.0575	0.0646	0.0561	0.0635	0.230	0.200	0.227
35	0.0584	0.0503	0.0575	0.0642	0.0562	0.0636	0.229	0.199	0.227
36	0.0583	0.0502	0.0574	0.0641	0.0561	0.0631	0.229	0.199	0.226
37	0.0582	0.0502	0.0574	0.0640	0.0561	0.0631	0.229	0.199	0.226
38	0.0581	0.0501	0.0574	0.0637	0.0557	0.0631	0.229	0.199	0.226
39	0.0581	0.0501	0.0574	0.0638	0.0558	0.0629	0.229	0.199	0.226
40	0.0582	0.0501	0.0574	0.0639	0.0561	0.0631	0.229	0.199	0.226
41	0.0581	0.0501	0.0573	0.0639	0.0559	0.0627	0.229	0.199	0.226
42	0.0581	0.0501	0.0573	0.0639	0.0558	0.0630	0.229	0.199	0.226
43	0.0580	0.0501	0.0573	0.0639	0.0558	0.0629	0.229	0.199	0.226
44	0.0581	0.0501	0.0573	0.0639	0.0559	0.0631	0.229	0.199	0.226
45	0.0580	0.0501	0.0573	0.0637	0.0559	0.0631	0.228	0.199	0.226
46	0.0580	0.0501	0.0573	0.0636	0.0556	0.0628	0.228	0.199	0.226
47	0.0579	0.0501	0.0573	0.0635	0.0557	0.0631	0.228	0.199	0.226
48	0.0579	0.0501	0.0573	0.0636	0.0558	0.0634	0.228	0.199	0.226
49	0.0579	0.0501	0.0573	0.0636	0.0557	0.0629	0.228	0.199	0.226
50	0.0579	0.0501	0.0573	0.0638	0.0557	0.0632	0.228	0.199	0.226
51	0.0579	0.0501	0.0573	0.0637	0.0557	0.0629	0.228	0.199	0.226
52	0.0578	0.0500	0.0572	0.0636	0.0557	0.0624	0.228	0.198	0.226
53	0.0578	0.0500	0.0572	0.0633	0.0557	0.0626	0.228	0.198	0.226
54	0.0577	0.0499	0.0570	0.0631	0.0556	0.0621	0.228	0.198	0.225
55	0.0577	0.0499	0.0571	0.0632	0.0556	0.0624	0.228	0.198	0.225
56	0.0577	0.0499	0.0571	0.0633	0.0557	0.0627	0.228	0.198	0.226
57	0.0578	0.0499	0.0571	0.0632	0.0558	0.0624	0.228	0.198	0.226
58	0.0578	0.0500	0.0571	0.0635	0.0559	0.0624	0.228	0.198	0.226
59	0.0578	0.0499	0.0571	0.0632	0.0559	0.0623	0.228	0.198	0.226
60	0.0578	0.0499	0.0571	0.0632	0.0557	0.0622	0.228	0.198	0.226
61	0.0578	0.0499	0.0571	0.0632	0.0558	0.0621	0.228	0.198	0.225
62	0.0578	0.0499	0.0571	0.0635	0.0558	0.0621	0.228	0.198	0.226
63	0.0577	0.0499	0.0571	0.0635	0.0557	0.0619	0.228	0.198	0.226
64	0.0577	0.0499	0.0571	0.0633	0.0558	0.0618	0.228	0.198	0.225
65	0.0577	0.0499	0.0571	0.0635	0.0559	0.0618	0.228	0.198	0.225
66	0.0577	0.0499	0.0570	0.0633	0.0559	0.0616	0.228	0.198	0.225
67	0.0577	0.0499	0.0571	0.0635	0.0560	0.0618	0.228	0.198	0.225
68	0.0577	0.0499	0.0571	0.0636	0.0559	0.0615	0.228	0.198	0.225
69	0.0577	0.0499	0.0571	0.0635	0.0559	0.0616	0.228	0.198	0.225
70	0.0577	0.0499	0.0571	0.0636	0.0561	0.0618	0.228	0.198	0.225
71	0.0577	0.0500	0.0571	0.0636	0.0560	0.0618	0.228	0.198	0.226
72	0.0577	0.0500	0.0571	0.0635	0.0562	0.0621	0.228	0.198	0.226
73	0.0578	0.0501	0.0572	0.0637	0.0564	0.0621	0.228	0.198	0.226
74	0.0578	0.0500	0.0572	0.0636	0.0563	0.0621	0.228	0.198	0.226
75	0.0577	0.0500	0.0571	0.0635	0.0563	0.0623	0.228	0.198	0.226
76	0.0577	0.0500	0.0571	0.0635	0.0564	0.0625	0.228	0.198	0.226
77	0.0577	0.0500	0.0572	0.0637	0.0564	0.0624	0.228	0.198	0.226
78	0.0577	0.0500	0.0571	0.0634	0.0563	0.0624	0.228	0.198	0.225
79	0.0577	0.0500	0.0571	0.0635	0.0563	0.0622	0.228	0.198	0.225
80	0.0577	0.0500	0.0571	0.0636	0.0563	0.0624	0.228	0.198	0.225
81	0.0577	0.0500	0.0571	0.0636	0.0564	0.0624	0.228	0.198	0.225
82	0.0577	0.0500	0.0571	0.0636	0.0564	0.0622	0.228	0.198	0.225
83	0.0577	0.0500	0.0571	0.0635	0.0564	0.0623	0.228	0.198	0.225
84	0.0577	0.0500	0.0571	0.0635	0.0563	0.0620	0.228	0.198	0.225
85	0.0577	0.0500	0.0571	0.0635	0.0562	0.0624	0.228	0.198	0.225
86	0.0577	0.0500	0.0571	0.0637	0.0563	0.0623	0.228	0.198	0.225
87	0.0576	0.0499	0.0571	0.0638	0.0563	0.0622	0.227	0.198	0.225
88	0.0576	0.0499	0.0571	0.0635	0.0563	0.0621	0.228	0.198	0.225
89	0.0576	0.0499	0.0571	0.0633	0.0562	0.0622	0.227	0.198	0.225
90	0.0576	0.0499	0.0571	0.0632	0.0562	0.0623	0.228	0.198	0.225
91	0.0576	0.0499	0.0571	0.0632	0.0563	0.0624	0.227	0.198	0.225
92	0.0576	0.0499	0.0571	0.0631	0.0562	0.0625	0.227	0.198	0.225
93	0.0576	0.0499	0.0571	0.0633	0.0561	0.0625	0.227	0.198	0.225
94	0.0576	0.0499	0.0570	0.0633	0.0561	0.0625	0.227	0.198	0.225
95	0.0576	0.0499	0.0571	0.0633	0.0562	0.0626	0.227	0.198	0.225
96	0.0576	0.0499	0.0571	0.0633	0.0563	0.0625	0.227	0.198	0.225
97	0.0576	0.0499	0.0571	0.0632	0.0562	0.0626	0.227	0.198	0.225
98	0.0576	0.0499	0.0571	0.0632	0.0562	0.0624	0.227	0.198	0.225
99	0.0576	0.0499	0.0570	0.0631	0.0562	0.0624	0.227	0.198	0.225
100	0.0576	0.0499	0.0570	0.0632	0.0561	0.0624	0.227	0.198	0.225

Predicted Probability Variables	
churn	Variable
1	P_churn1
0	P_churn0

Predicted Target Variable	
Level Index	Variable
	I_churn