

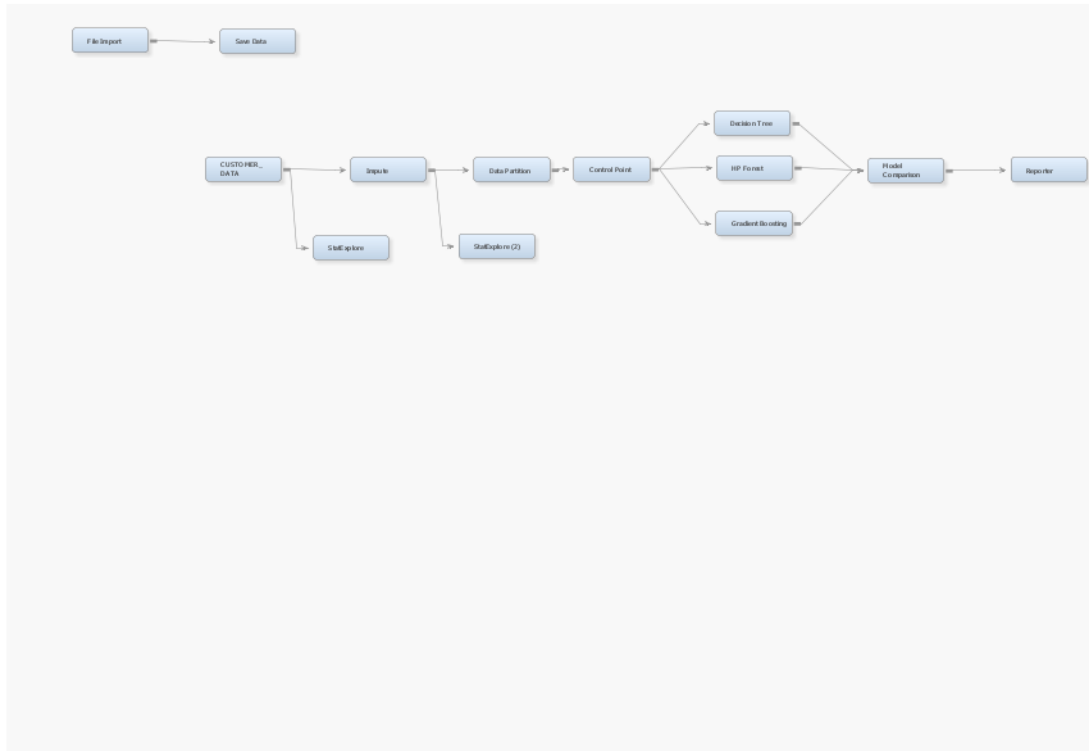
SAS Enterprise Miner Report

User = u63467097
Date = 07:10:55 08 January 2024
Project = 7005-lecture
Diagram = AA1

Start Node = Report
Node label = Reporter
Nodes = PATH
Showall = N

Format = PDF
Style = LISTING

SAS Enterprise Miner Report Process Flow Diagram



SAS Enterprise Miner Report

Node=CUSTOMER_DATA
Summary

Node id = Ids
Node label = CUSTOMER_DATA
Meta path = Ids
Notes =

Node=CUSTOMER_DATA
Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	DataSource		DsCreatedBy	u63467097		NBytes	263168	.
ApplyIntervalLevelLowerLimit	Y		DsId	customerdata		NCols	12	.
ApplyMaxClassLevels	Y		DsModifiedBy	u63467097		NObs	1500	.
ApplyMaxPercentMissing	Y		DsModifyDate	2020172356.4		NewTable		
CMeta	WORK.M3CS7H51		DsSampleName			NewVariableRole	REJECT	
ComputeStatistics	N		DsSampleSize			OutputType	VIEW	
DBPassThrough	Y		DsSampleSizeType			Role	RAW	TRAIN
Data	AAEM61.CUSTOMER_DATA		DsScope	LOCAL		Sample	D	
DataSelection	DATASOURCE		IdentifyEmptyColumns	Y		SampleSizeObs	10000	
DataSource	customerdata		IntervalLowerLimit	20		SampleSizePercent	20	
DataSourceRole	RAW		Library	AAEM61		SampleSizeType	PERCENT	
Description			MaxClassLevels	20		Scope	LOCAL	
DropMapVariables	Y		MaxPercentMissing	50		Segment		
DsCreateDate	2020172356.4		MetaAdvisor	BASIC		Table	CUSTOMER_DATA	

Node=CUSTOMER_DATA
Data Attributes

Attribute	Value	Attribute	Value	Attribute	Value
Data Name	CUSTOMER_DATA	Date Created	06 January 2024 14:54:08	Data Size	263168
Data Type	DATA	Date Modified	06 January 2024 14:54:08	Role	RAW
Data Label		Number Rows	1500	Segment	
Engine	BASE	Number Columns	12	Data Library	AAEM61

Node=CUSTOMER_DATA
Variables List

Name	Label	Role	Level	Type	Length	Format	Creator
Age		INPUT	INTERVAL	N	8	BEST12.0	
Churn		TARGET	INTERVAL	N	8	BEST12.0	
CustomerID		ID	NOMINAL	N	8	BEST12.0	
FavoriteCategory		INPUT	NOMINAL	C	11	\$11.	
FrequencyOfWebsiteVisits		INPUT	NOMINAL	C	7	\$7.	
Gender		INPUT	NOMINAL	C	6	\$6.	
LastPurchaseDate		INPUT	INTERVAL	N	8	MMDDYY10.0	
Location		INPUT	NOMINAL	C	11	\$11.	
MembershipLevel		INPUT	NOMINAL	C	8	\$8.	
Occupation		INPUT	NOMINAL	C	11	\$11.	
TotalPurchases		INPUT	INTERVAL	N	8	BEST12.0	
TotalSpent		INPUT	INTERVAL	N	8	BEST12.0	

SAS Enterprise Miner Report

Node=Impute Summary

Node id = Impt
Node label = Impute
Meta path = Ids => Impt
Notes =

Node=Impute Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	Impute		IndicatorRole	REJECTED		MinCatSize	5	
ABWTuning	9		IndicatorSource	IMPUTED		Normalize	Y	
AHUBERTuning	1.5		LeafSize	5		Nrules	5	
AWAVETuning	6.2831853072		MaxPctMissing	50		Nsurrs	2	
DefaultChar			Maxbranch	2		RandomSeed	12345	
DefaultNum	.		Maxdepth	6		ReplaceVariable	N	
DistributionMissing	N		MethodClass	TREESURR	COUNT	SpacingProportion	90	
HideVariable	Y		MethodInterval	MEAN		Splitsize	.	
ImputeNoMissing	N		MethodTargetClass	NONE		ValidateTestMissing	N	
Indicator	NONE		MethodTargetInterval	NONE				

Node=Impute Variable Summary

Role	Level	Frequency Count	Name
INPUT	INTERVAL	4	Age LastPurchaseDate TotalPurchases TotalSpent
INPUT	NOMINAL	6	FavoriteCategory FrequencyOfWebsiteVisits Gender Location MembershipLevel Occupation

Node=Impute Imputation Summary

Variable Name	Impute Method	Imputed Variable	Impute Value	Role	Measurement Level	Label	Number of Missing for TRAIN
Age	MEAN	IMP_Age	43.48	INPUT	INTERVAL		75
FavoriteCategory	TREESURR	IMP_FavoriteCategory	.	INPUT	NOMINAL		75
TotalPurchases	MEAN	IMP_TotalPurchases	50.41	INPUT	INTERVAL		75
TotalSpent	MEAN	IMP_TotalSpent	1162.60	INPUT	INTERVAL		75

SAS Enterprise Miner Report

Node=Data Partition Summary

Node id = Part
Node label = Data Partition
Meta path = Ids => Impt => Part
Notes =

Node=Data Partition Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	Partition		Method	DEFAULT		TestPct	0	30
ClassDistribution	Y		OutputType	DATA		TrainPct	70	40
IntervalDistribution	Y		RandomSeed	12345		ValidatePct	30	

Node=Data Partition Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Churn
INPUT	INTERVAL	4	IMP_Age IMP_TotalPurchases IMP_TotalSpent LastPurchaseDate
INPUT	NOMINAL	6	FrequencyOfWebsiteVisits Gender IMP_FavoriteCategory Location MembershipLevel Occupation
ID	NOMINAL	1	CustomerID
ASSESS	NOMINAL	1	_WARN_

SAS Enterprise Miner Report

Node=Decision Tree
Summary

Node id = Tree
Node label = Decision Tree
Meta path = Ids => Impt => Part => Tree
Notes =

Node=Decision Tree
Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	DecisionTree		Kass	Y		Pred	N	
AVG	Y		KassApply	BEFORE		Predict	Y	
AssessMeasure	PROFIT/LOSS		LeafSize	5		ProfitLoss	NONE	
AssessPercentage	0.25		Leafid	Y		RASE	N	
CV	N		Maxbranch	2		SampleMethod	RANDOM	
CVNlter	10		Maxdepth	6		SampleSeed	12345	
CVRepeat	1		MinCatSize	5		SampleSize	10000	
CVSeed	12345		MissingValue	USEINSEARCH		ShowNodeId	Y	
ClassColorBy	PERCENTCORRECT		NSubtree	1		ShowValid	Y	
Count	Y		NodeRole	SEGMENT		SigLevel	0.2	
CreateSample	DEFAULT		NodeSample	20000		SplitPrecision	4	
Criterion	DEFAULT		NominalCriterion	PROBCHISQ		Splitsize	.	
Depth	Y		Nrules	5		Subtree	ASSESSMENT	
Dummy	N		Nsurrs	0		Target	ALL	
Exhaustive	5000		NumInputs	1		ToolType	MODEL	
Freeze	N		NumSingleImp	5		TrainMode	BATCH	
ImportModel	N		ObsImportance	Y	N	UseDecision	N	
ImportedTreeData			OrdinalCriterion	ENTROPY		UseMultipleTarget	N	
Inputs	N		PercentCorrect	N		UsePriors	N	
IntColorBy	AVG		Performance	DISK		UseVarOnce	N	
IntervalCriterion	PROBF		Precision	4		VarSelection	Y	

Node=Decision Tree
Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Churn
INPUT	INTERVAL	4	IMP_Age IMP_TotalPurchases IMP_TotalSpent LastPurchaseDate
INPUT	NOMINAL	6	FrequencyOfWebsiteVisits Gender IMP_FavoriteCategory Location MembershipLevel Occupation
ID	INTERVAL	1	_dataobs_
ID	NOMINAL	1	CustomerID

Node=Decision Tree
Model Fit Statistics

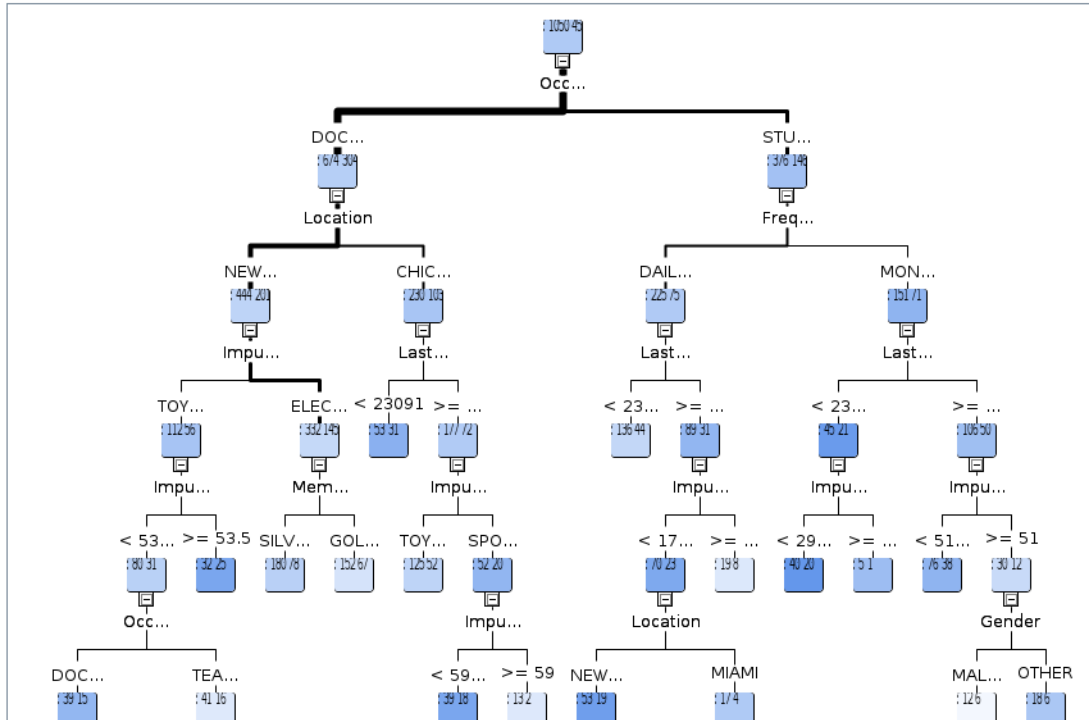
Target=Churn Target Label='1'

Label of Statistic	Train	Validation	Test
Sum of Frequencies	1050.00	450.000	.
Maximum Absolute Error	0.98	1.000	.
Sum of Squared Errors	187.40	106.058	.
Average Squared Error	0.18	0.236	.
Root Average Squared Error	0.42	0.485	.

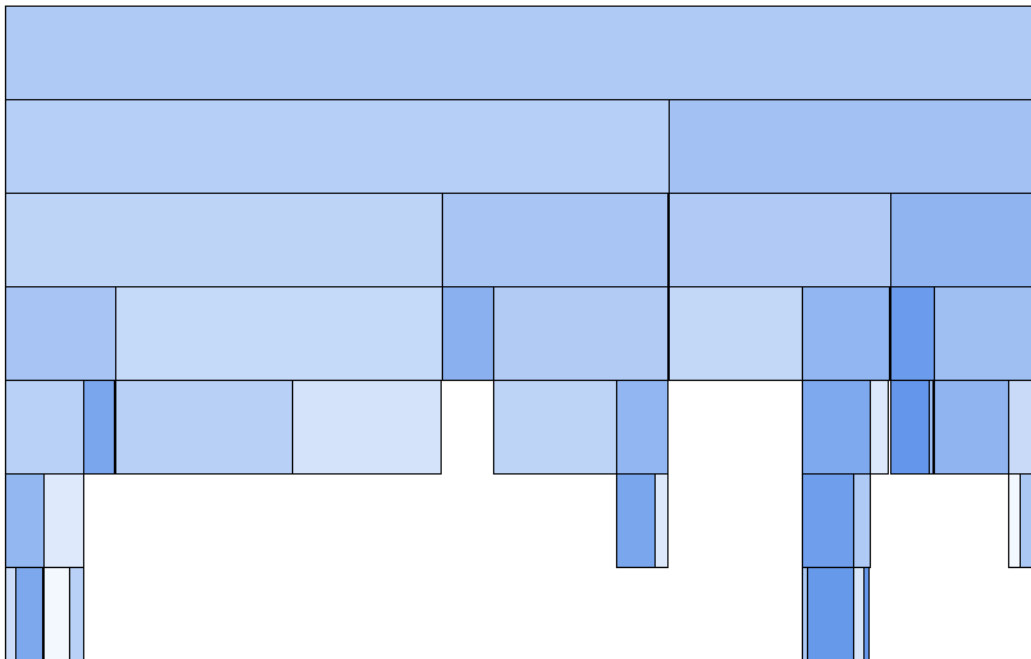
Target=Churn Target Label=

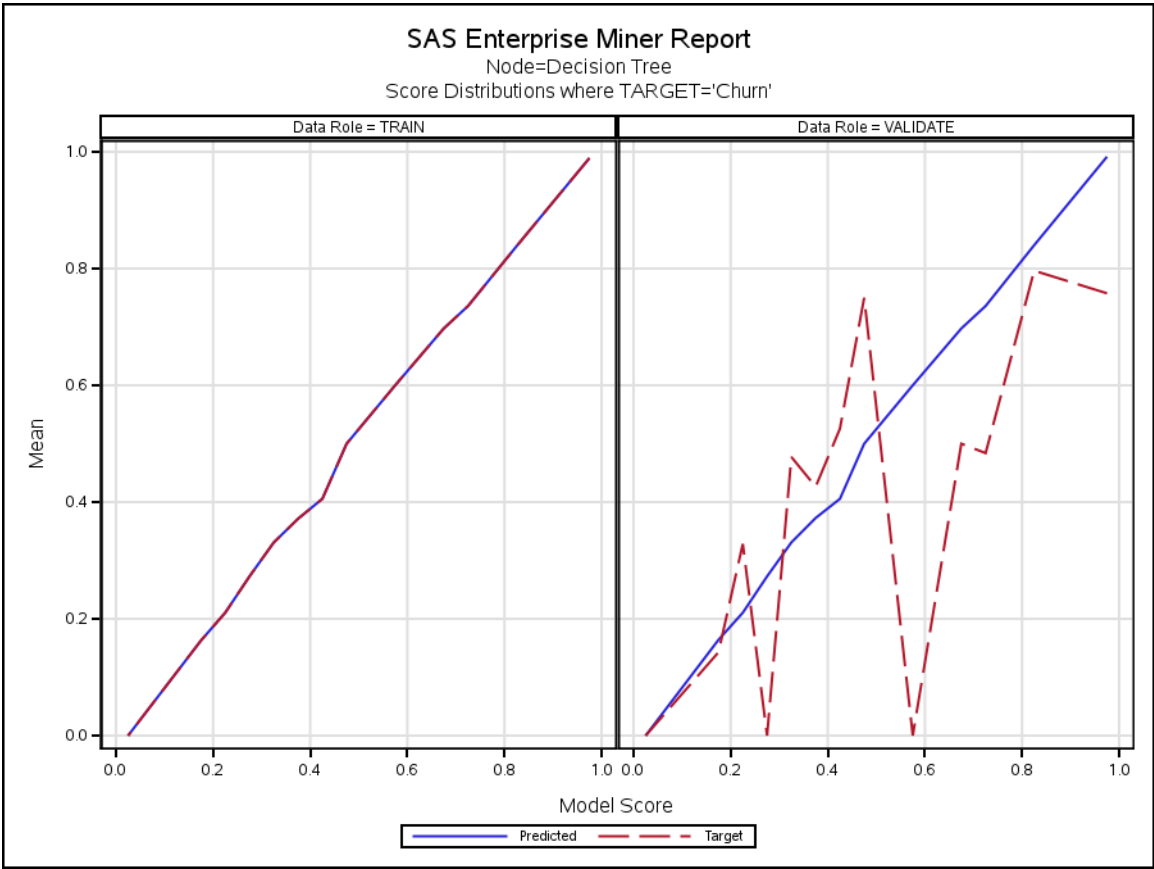
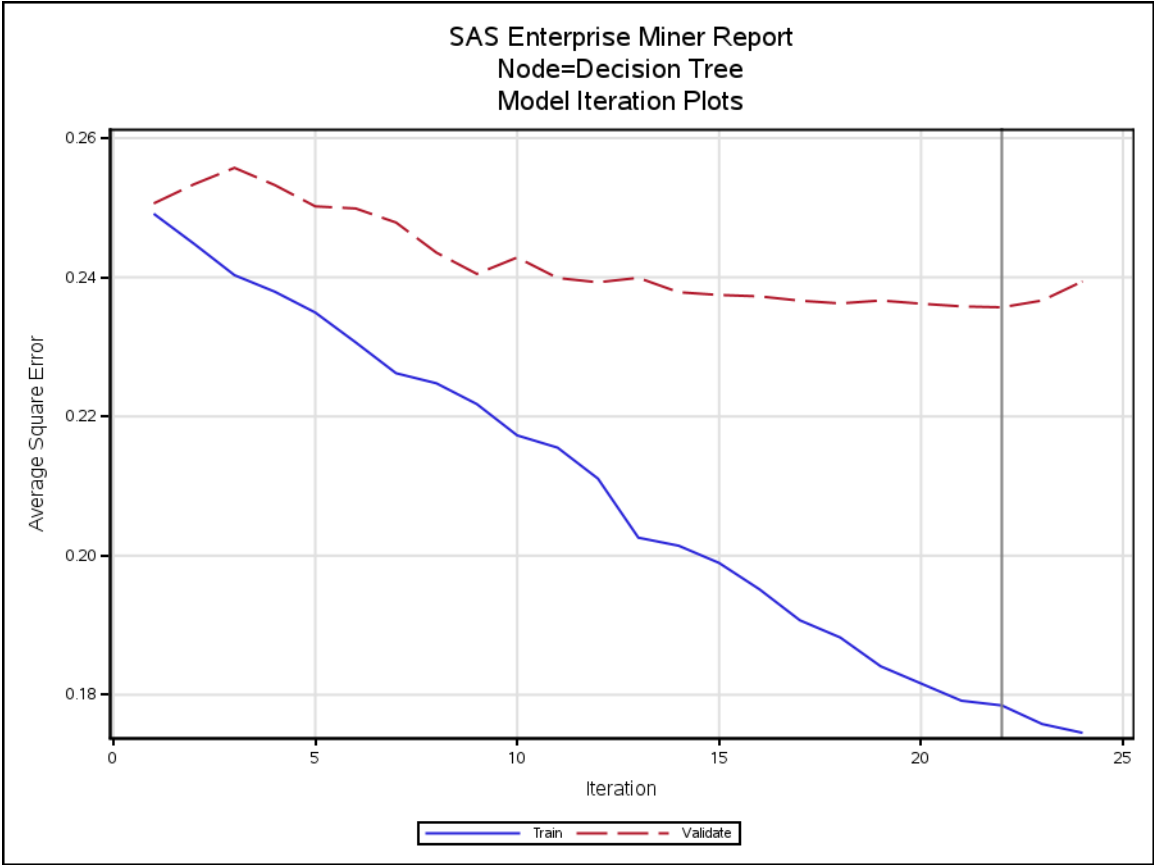
Label of Statistic	Train	Validation	Test
Divisor for ASE	1050.00	450.000	.
Total Degrees of Freedom	1050.00	.	.

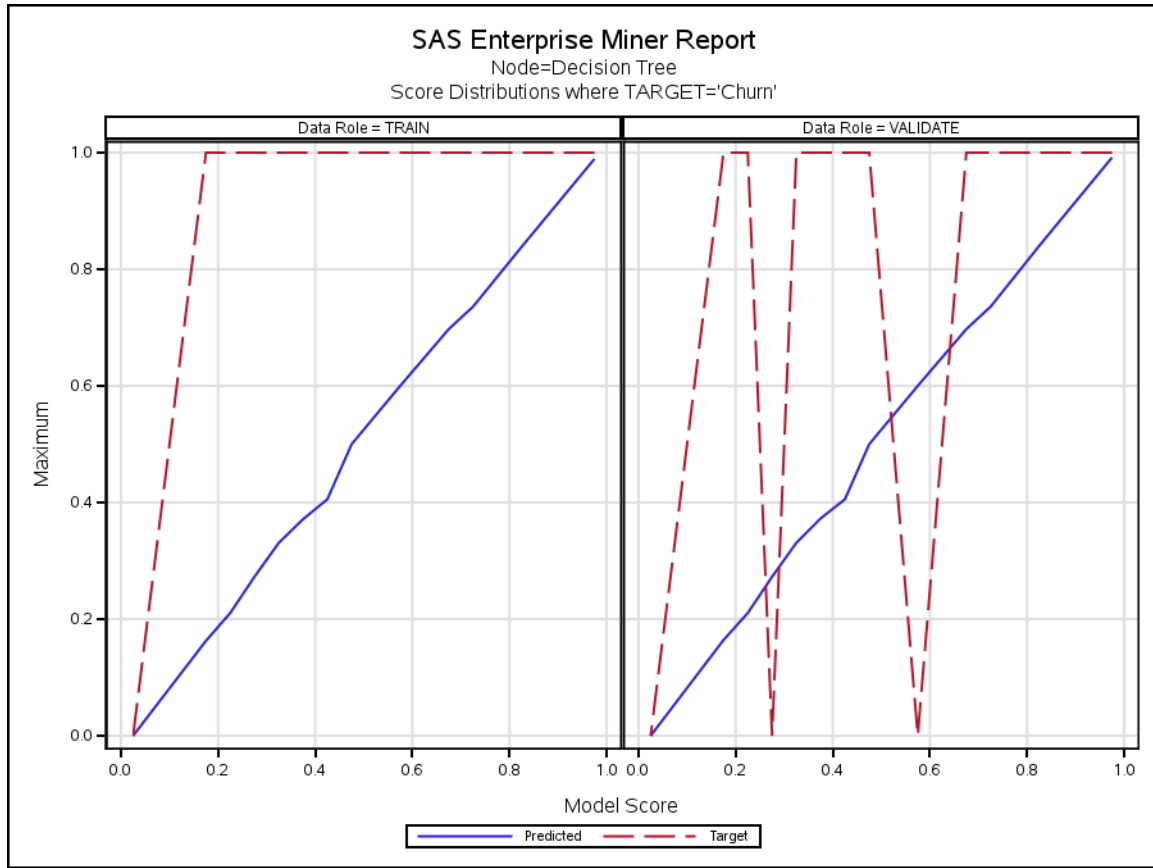
SAS Enterprise Miner Report Node=Decision Tree Tree Diagram



SAS Enterprise Miner Report Node=Decision Tree Treemap







Node=Decision Tree Score Distributions

Target Variable=Churn Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.950 - 1.000	0.98925	1.00000	0.97872	0.98925	1	0
0.800 - 0.850	0.83838	0.84615	0.82143	0.83838	1	0
0.700 - 0.750	0.73585	0.73585	0.73585	0.73585	1	0
0.650 - 0.700	0.69737	0.69737	0.69737	0.69737	1	0
0.550 - 0.600	0.60000	0.60000	0.60000	0.60000	1	0
0.450 - 0.500	0.50000	0.50000	0.50000	0.50000	1	0
0.400 - 0.450	0.40556	0.40556	0.40556	0.40556	1	0
0.350 - 0.400	0.37143	0.40000	0.36800	0.37143	1	0
0.300 - 0.350	0.33088	0.33088	0.33088	0.33088	1	0
0.250 - 0.300	0.27273	0.27273	0.27273	0.27273	1	0
0.200 - 0.250	0.21053	0.21053	0.21053	0.21053	1	0
0.150 - 0.200	0.16279	0.18182	0.15385	0.16279	1	0
-0.000 - 0.050	0.00000	0.00000	0.00000	0.00000	0	0

Target Variable=Churn Data Role=VALIDATE

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.950 - 1.000	0.99162	1.00000	0.97872	0.75758	1	0
0.800 - 0.850	0.84000	0.84615	0.82143	0.79630	1	0
0.700 - 0.750	0.73585	0.73585	0.73585	0.48387	1	0
0.650 - 0.700	0.69737	0.69737	0.69737	0.50000	1	0
0.550 - 0.600	0.60000	0.60000	0.60000	0.00000	0	0
0.450 - 0.500	0.50000	0.50000	0.50000	0.75000	1	0
0.400 - 0.450	0.40556	0.40556	0.40556	0.52564	1	0
0.350 - 0.400	0.37272	0.40000	0.36800	0.42623	1	0
0.300 - 0.350	0.33088	0.33088	0.33088	0.47727	1	0
0.250 - 0.300	0.27273	0.27273	0.27273	0.00000	0	0
0.200 - 0.250	0.21053	0.21053	0.21053	0.32836	1	0

Target Variable=Churn Data Role=VALIDATE

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.150 - 0.200	0.16415	0.18182	0.15385	0.14286	1	0
-0.000 - 0.050	0.00000	0.00000	0.00000	0.00000	0	0

SAS Enterprise Miner Report

Node=HP Forest Summary

Node id = HPDMForest
Node label = HP Forest
Meta path = Ids => Impt => Part => HPDMForest
Notes =

Node=HP Forest Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	HPDMForest		MAXTREES	100		SEED	12345	
ALPHA	0.05		MINCATSIZE	5		SPLITSIZE	.	
CATBINS	30		MINUSEINSEARCH	1		TRAINFRACTION	0.6	
EXHAUSTIVE	5000		MISSING	USEINSEARCH		TRAINN	.	
LEAFFRACTION	0.00001		MODELING	Y		ToolType	MODEL	
LEAFSIZE	1		NUMOBSMETHOD	PERCENTAGE		VARSELECT	Y	
LEAFSIZEMETHOD	DEFAULT		RBACUT	0.01		VARSELECT	Y	
MAXDEPTH	50		RBATOPNUM	25		VIMETHOD	LOSSREDUCTION	

Node=HP Forest Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Churn
INPUT	INTERVAL	4	IMP_Age IMP_TotalPurchases IMP_TotalSpent LastPurchaseDate
INPUT	NOMINAL	6	FrequencyOfWebsiteVisits Gender IMP_FavoriteCategory Location MembershipLevel Occupation
ID	INTERVAL	1	_dataobs_
ID	NOMINAL	1	CustomerID

Node=HP Forest Model Fit Statistics

Target=Churn Target Label=''

Label of Statistic	Train	Validation	Test
Average Squared Error	0.22	0.237	.
Divisor for ASE	1050.00	450.000	.
Maximum Absolute Error	0.63	0.630	.
Sum of Frequencies	1050.00	450.000	.
Root Average Squared Error	0.47	0.487	.
Sum of Squared Errors	230.79	106.855	.

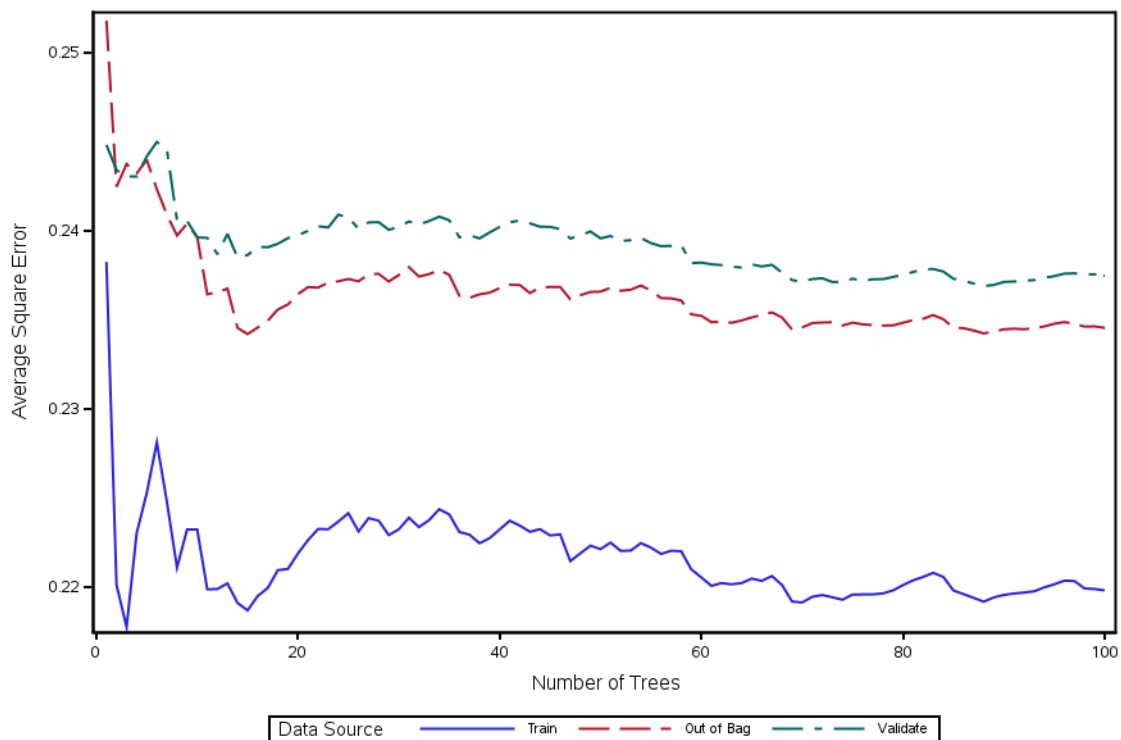
Node=HP Forest Iteration History

Number of Trees	Number of Leaves	Average Square Error (Train)	Average Square Error (Out of Bag)	Average Square Error (Validate)
1	7	0.23823	0.25177	0.24480
2	16	0.22011	0.24245	0.24338
3	27	0.21774	0.24372	0.24303
4	29	0.22301	0.24319	0.24302
5	33	0.22526	0.24396	0.24415

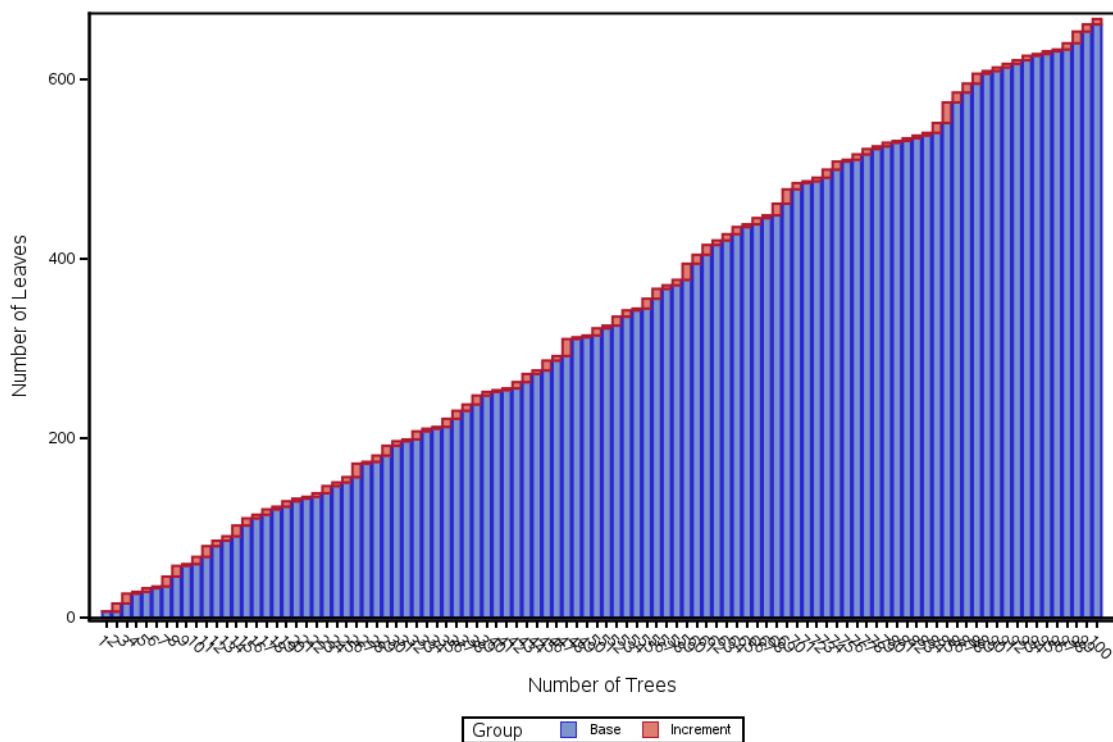
Number of Trees	Number of Leaves	Average Square Error (Train)	Average Square Error (Out of Bag)	Average Square Error (Validate)
6	35	0.22810	0.24231	0.24496
7	46	0.22475	0.24088	0.24453
8	58	0.22108	0.23971	0.24055
9	60	0.22322	0.24037	0.24053
10	68	0.22322	0.23963	0.23960
11	80	0.21986	0.23641	0.23958
12	86	0.21987	0.23653	0.23866
13	91	0.22019	0.23673	0.23980
14	103	0.21909	0.23453	0.23849
15	111	0.21868	0.23418	0.23861
16	115	0.21948	0.23455	0.23907
17	121	0.21993	0.23493	0.23906
18	124	0.22093	0.23556	0.23925
19	130	0.22100	0.23584	0.23956
20	133	0.22187	0.23643	0.23973
21	135	0.22262	0.23681	0.23997
22	139	0.22324	0.23679	0.24023
23	147	0.22323	0.23708	0.24016
24	151	0.22366	0.23714	0.24088
25	157	0.22413	0.23727	0.24072
26	172	0.22310	0.23714	0.24009
27	174	0.22385	0.23754	0.24045
28	181	0.22371	0.23756	0.24046
29	192	0.22290	0.23713	0.24003
30	197	0.22323	0.23749	0.24020
31	199	0.22388	0.23793	0.24050
32	208	0.22335	0.23740	0.24033
33	211	0.22374	0.23754	0.24052
34	213	0.22435	0.23778	0.24077
35	222	0.22406	0.23750	0.24056
36	231	0.22307	0.23633	0.23961
37	238	0.22293	0.23621	0.23972
38	248	0.22244	0.23641	0.23955
39	252	0.22273	0.23650	0.23988
40	254	0.22321	0.23676	0.24019
41	256	0.22371	0.23695	0.24045
42	263	0.22343	0.23693	0.24055
43	272	0.22309	0.23648	0.24039
44	276	0.22323	0.23680	0.24020
45	287	0.22288	0.23682	0.24020
46	292	0.22294	0.23683	0.24007
47	311	0.22144	0.23613	0.23954
48	313	0.22188	0.23636	0.23972
49	315	0.22230	0.23654	0.23994
50	323	0.22211	0.23656	0.23955
51	326	0.22248	0.23678	0.23968
52	336	0.22201	0.23661	0.23940
53	343	0.22203	0.23667	0.23945
54	345	0.22245	0.23690	0.23957
55	356	0.22220	0.23662	0.23929
56	367	0.22184	0.23620	0.23911
57	371	0.22202	0.23618	0.23913

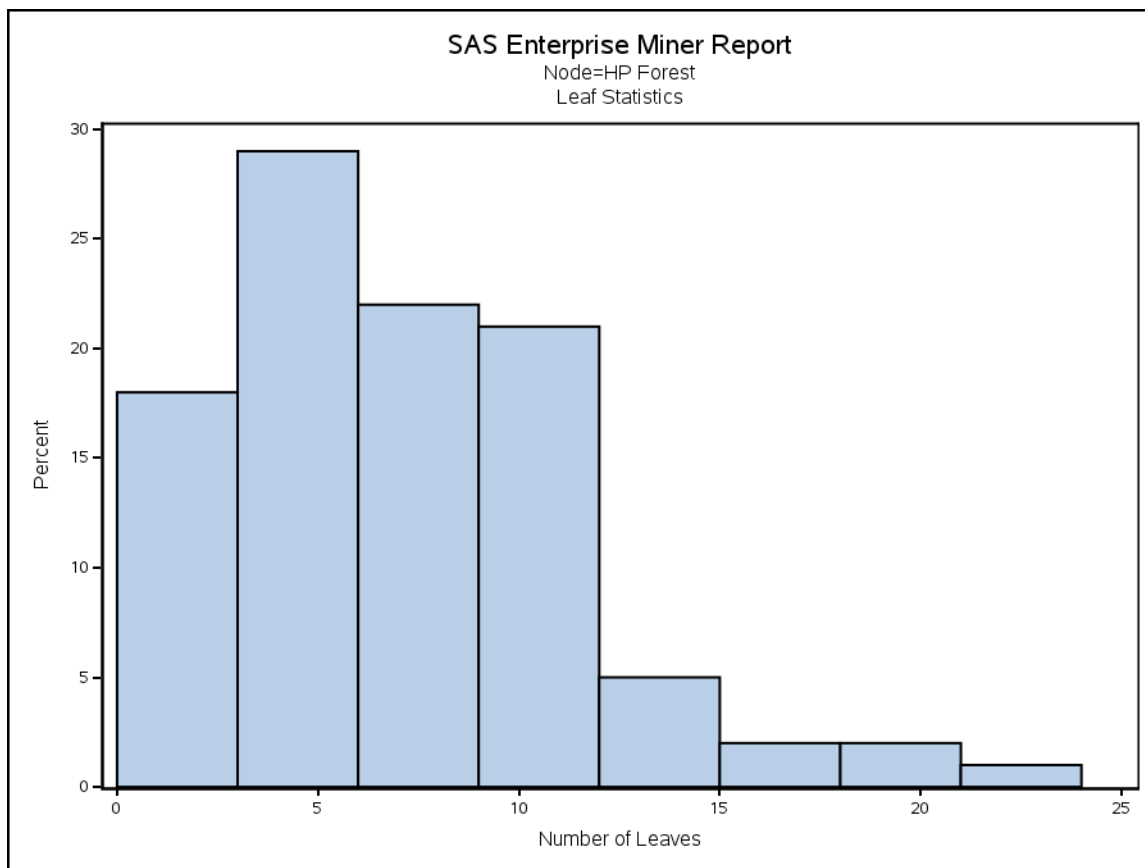
Number of Trees	Number of Leaves	Average Square Error (Train)	Average Square Error (Out of Bag)	Average Square Error (Validate)
58	377	0.22199	0.23606	0.23917
59	395	0.22098	0.23529	0.23816
60	405	0.22052	0.23520	0.23819
61	416	0.22005	0.23485	0.23809
62	421	0.22021	0.23488	0.23805
63	428	0.22014	0.23482	0.23796
64	436	0.22021	0.23494	0.23791
65	439	0.22046	0.23511	0.23809
66	446	0.22033	0.23526	0.23797
67	449	0.22060	0.23539	0.23807
68	462	0.22010	0.23511	0.23763
69	478	0.21917	0.23444	0.23721
70	485	0.21912	0.23455	0.23711
71	487	0.21944	0.23480	0.23727
72	491	0.21954	0.23483	0.23731
73	500	0.21941	0.23485	0.23710
74	509	0.21927	0.23466	0.23710
75	511	0.21956	0.23482	0.23729
76	517	0.21957	0.23473	0.23715
77	523	0.21957	0.23468	0.23726
78	526	0.21963	0.23466	0.23726
79	530	0.21979	0.23467	0.23738
80	532	0.22009	0.23481	0.23752
81	535	0.22036	0.23496	0.23766
82	538	0.22055	0.23504	0.23782
83	541	0.22078	0.23525	0.23783
84	552	0.22055	0.23501	0.23769
85	575	0.21979	0.23454	0.23728
86	586	0.21959	0.23451	0.23717
87	596	0.21938	0.23438	0.23702
88	607	0.21916	0.23422	0.23688
89	610	0.21940	0.23432	0.23693
90	614	0.21954	0.23445	0.23710
91	618	0.21962	0.23448	0.23713
92	622	0.21968	0.23445	0.23718
93	627	0.21974	0.23451	0.23721
94	629	0.21996	0.23461	0.23734
95	632	0.22014	0.23476	0.23743
96	634	0.22034	0.23485	0.23757
97	641	0.22032	0.23476	0.23759
98	654	0.21991	0.23460	0.23754
99	662	0.21987	0.23461	0.23753
100	668	0.21980	0.23453	0.23746

SAS Enterprise Miner Report

Node=HP Forest
Iteration Plot

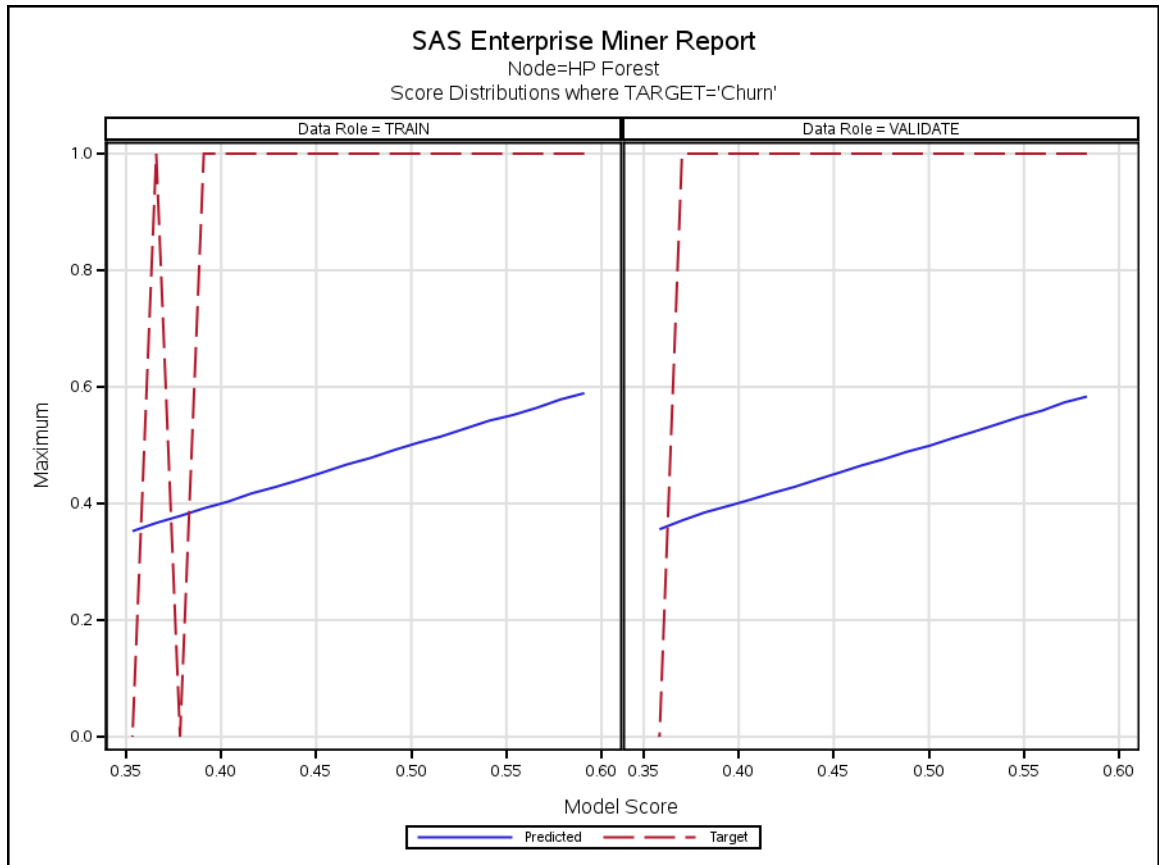
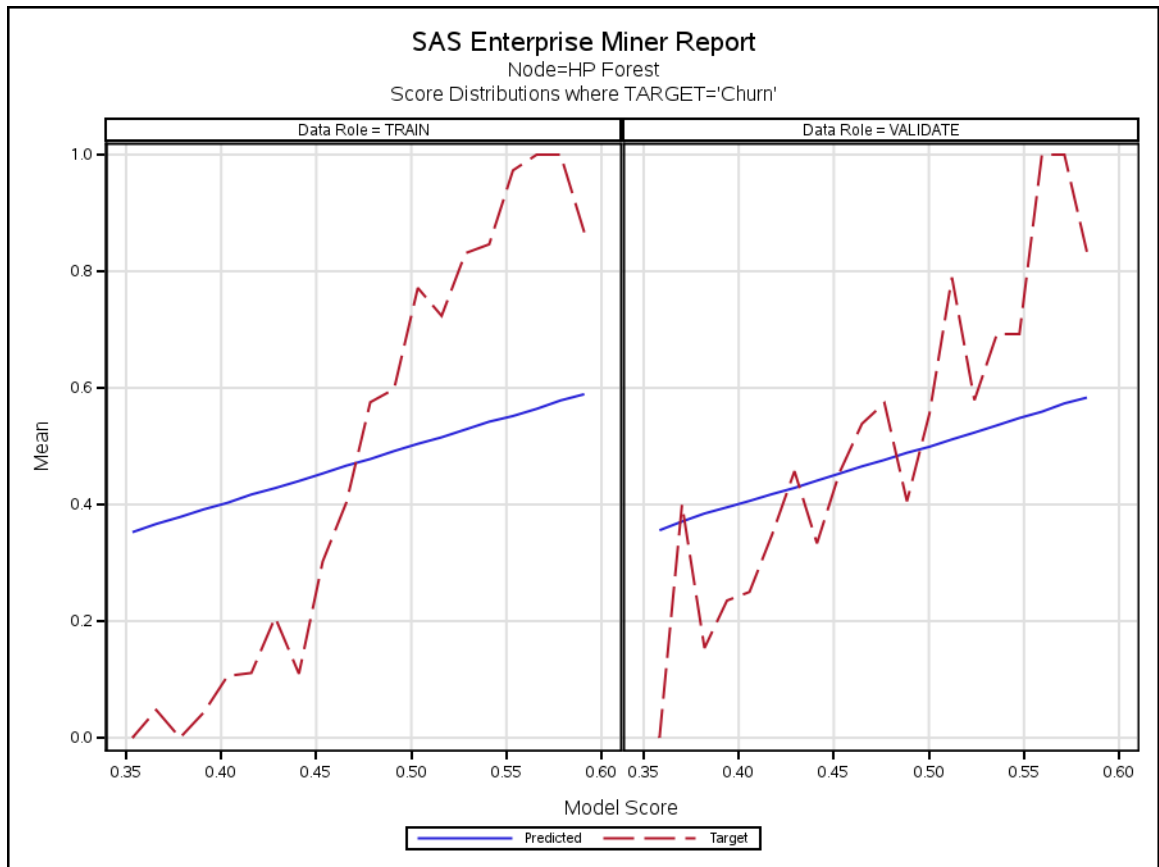
SAS Enterprise Miner Report

Node=HP Forest
Leaf Plot



Node=HP Forest
Variable Importance

Variable Name	Number of Splitting Rules	Train: Mean Square Error	Train: Absolute Error	OOB: Mean Square Error	OOB: Absolute Error	Valid: Mean Square Error	Valid: Absolute Error	Label
LastPurchaseDate	86	0.002658	0.005244	-0.00054	0.001937	-0.00054	0.002025	
IMP_Age	79	0.002374	0.004748	-0.00019	0.002094	-0.00016	0.002098	Imputed Age
MembershipLevel	71	0.002609	0.005250	-0.00064	0.001969	-0.00043	0.002326	
Occupation	68	0.003642	0.007478	-0.00068	0.003249	-0.00253	0.001352	
IMP_FavoriteCategory	62	0.002255	0.004801	-0.00067	0.001707	-0.00022	0.002214	Imputed FavoriteCategory
IMP_TotalPurchases	48	0.001574	0.003151	-0.00011	0.001446	0.00060	0.002136	Imputed TotalPurchases
Gender	44	0.001414	0.002754	-0.00029	0.000984	-0.00086	0.000523	
IMP_TotalSpent	43	0.001693	0.003386	-0.00021	0.001556	-0.00073	0.001067	Imputed TotalSpent
Location	40	0.001775	0.003547	-0.00010	0.001662	-0.00050	0.001117	
FrequencyOfWebsiteVisits	27	0.000958	0.001915	-0.00030	0.000715	-0.00017	0.000817	



Node=HP Forest
Score Distributions

Target Variable=Churn Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.585 - 0.597	0.58914	0.59723	0.58554	0.86667	1	0
0.572 - 0.585	0.57841	0.58382	0.57300	1.00000	1	1
0.560 - 0.572	0.56406	0.57186	0.56005	1.00000	1	1
0.547 - 0.560	0.55173	0.55596	0.54743	0.97297	1	0
0.535 - 0.547	0.54201	0.54714	0.53508	0.84615	1	0
0.522 - 0.535	0.52858	0.53456	0.52284	0.83099	1	0
0.510 - 0.522	0.51522	0.52198	0.51010	0.72340	1	0
0.497 - 0.510	0.50406	0.50948	0.49820	0.77143	1	0
0.485 - 0.497	0.49159	0.49701	0.48487	0.59783	1	0
0.472 - 0.485	0.47794	0.48459	0.47218	0.57534	1	0
0.460 - 0.472	0.46674	0.47199	0.46006	0.40404	1	0
0.447 - 0.460	0.45322	0.45960	0.44742	0.30233	1	0
0.435 - 0.447	0.44028	0.44707	0.43499	0.10976	1	0
0.422 - 0.435	0.42814	0.43348	0.42218	0.20635	1	0
0.410 - 0.422	0.41717	0.42185	0.41075	0.11111	1	0
0.397 - 0.410	0.40294	0.40918	0.39725	0.10606	1	0
0.385 - 0.397	0.39168	0.39672	0.38512	0.04348	1	0
0.372 - 0.385	0.37853	0.38362	0.37312	0.00000	0	0
0.360 - 0.372	0.36665	0.37151	0.36086	0.04762	1	0
0.347 - 0.360	0.35253	0.35894	0.34710	0.00000	0	0

Target Variable=Churn Data Role=VALIDATE

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.577 - 0.589	0.58330	0.58901	0.57948	0.83333	1	0
0.565 - 0.577	0.57339	0.57564	0.57083	1.00000	1	1
0.554 - 0.565	0.55913	0.56224	0.55498	1.00000	1	1
0.542 - 0.554	0.54829	0.55284	0.54252	0.69231	1	0
0.530 - 0.542	0.53569	0.54136	0.52996	0.69231	1	0
0.518 - 0.530	0.52338	0.52912	0.51814	0.57895	1	0
0.506 - 0.518	0.51159	0.51749	0.50626	0.78947	1	0
0.494 - 0.506	0.49898	0.50556	0.49438	0.55556	1	0
0.483 - 0.494	0.48871	0.49392	0.48285	0.40541	1	0
0.471 - 0.483	0.47637	0.48220	0.47082	0.57407	1	0
0.459 - 0.471	0.46542	0.47010	0.45925	0.53846	1	0
0.447 - 0.459	0.45304	0.45783	0.44707	0.45455	1	0
0.435 - 0.447	0.44094	0.44701	0.43538	0.33333	1	0
0.423 - 0.435	0.42843	0.43499	0.42407	0.45714	1	0
0.412 - 0.423	0.41778	0.42224	0.41162	0.34783	1	0
0.400 - 0.412	0.40608	0.40918	0.40005	0.25000	1	0
0.388 - 0.400	0.39517	0.39960	0.39039	0.23529	1	0
0.376 - 0.388	0.38455	0.38742	0.37993	0.15385	1	0
0.364 - 0.376	0.37081	0.37386	0.36956	0.40000	1	0
0.352 - 0.364	0.35579	0.36220	0.35243	0.00000	0	0

SAS Enterprise Miner Report

Node=Gradient Boosting Summary

Node id = Boost
Node label = Gradient Boosting
Meta path = Ids => Impt => Part => Boost
Notes =

Node=Gradient Boosting Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	Boost		MaxBranch	2		Performance	DISK	
AssessMeasure	PROFIT		MaxDepth	2		Precision	0	
CategoricalBins	30		Measure	PROFIT		ReUseVar	1	
CreateHStat	N		MinCatSize	5		Seed	12345	
Exhaustive	5000		Missing	USEINSEARCH		Shrinkage	0.1	
Huber	NO		NSurrs	0		SplitSize	.	
IntervalBins	100		NodeSize	20000		SubSeries	BEST	
IterationNum	1		NumPairImp	0		ToolType	MODEL	
Iterations	50		NumSingleImp	5		TrainProportion	60	
LeafFraction	0.001		ObsImportance	N		VarSelection	Y	

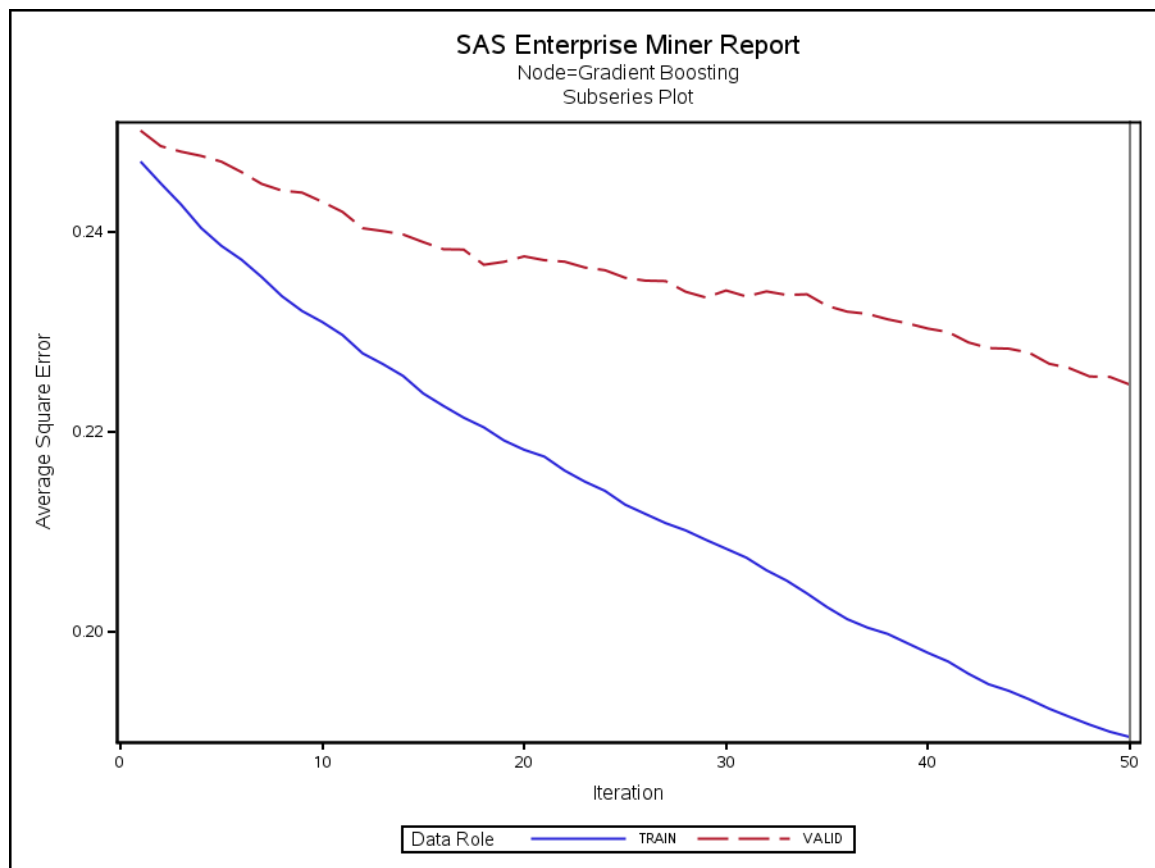
Node=Gradient Boosting Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Churn
INPUT	INTERVAL	4	IMP_Age IMP_TotalPurchases IMP_TotalSpent LastPurchaseDate
INPUT	NOMINAL	6	FrequencyOfWebsiteVisits Gender IMP_FavoriteCategory Location MembershipLevel Occupation
ID	INTERVAL	1	_dataobs_
ID	NOMINAL	1	CustomerID

Node=Gradient Boosting Model Fit Statistics

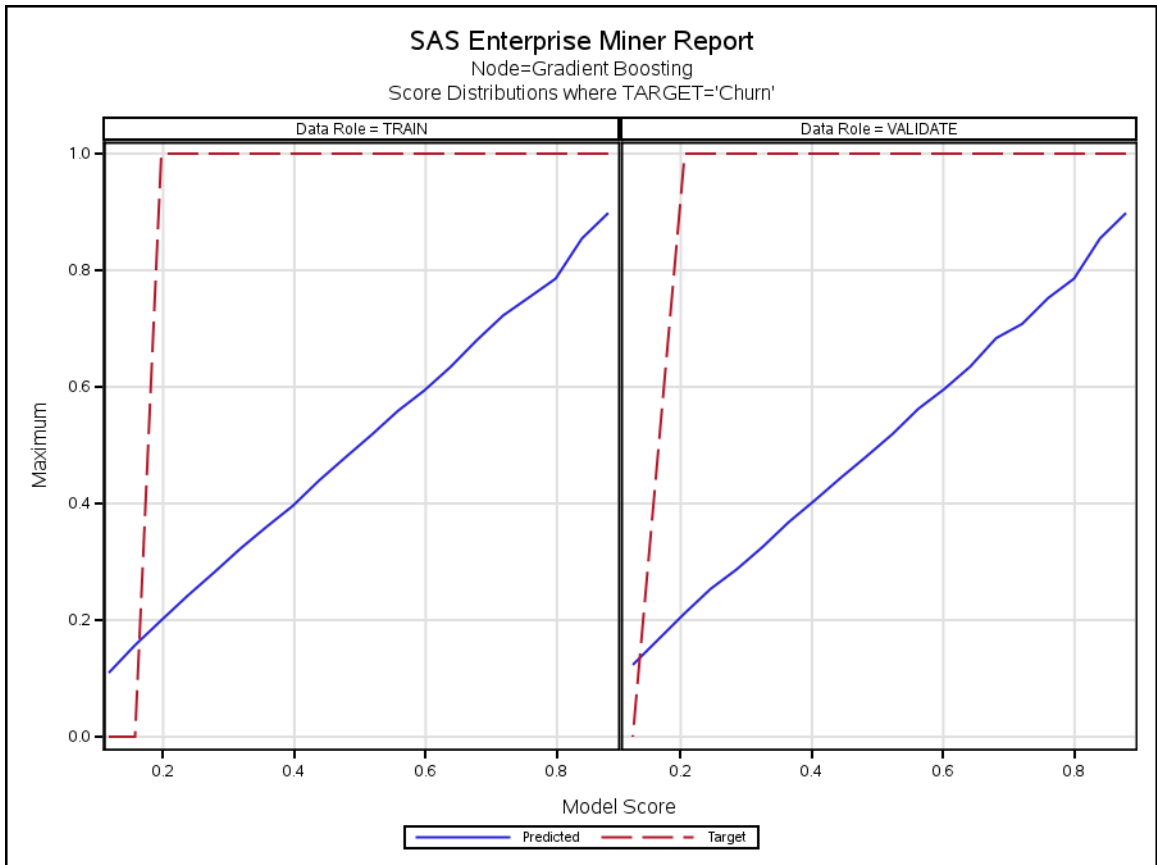
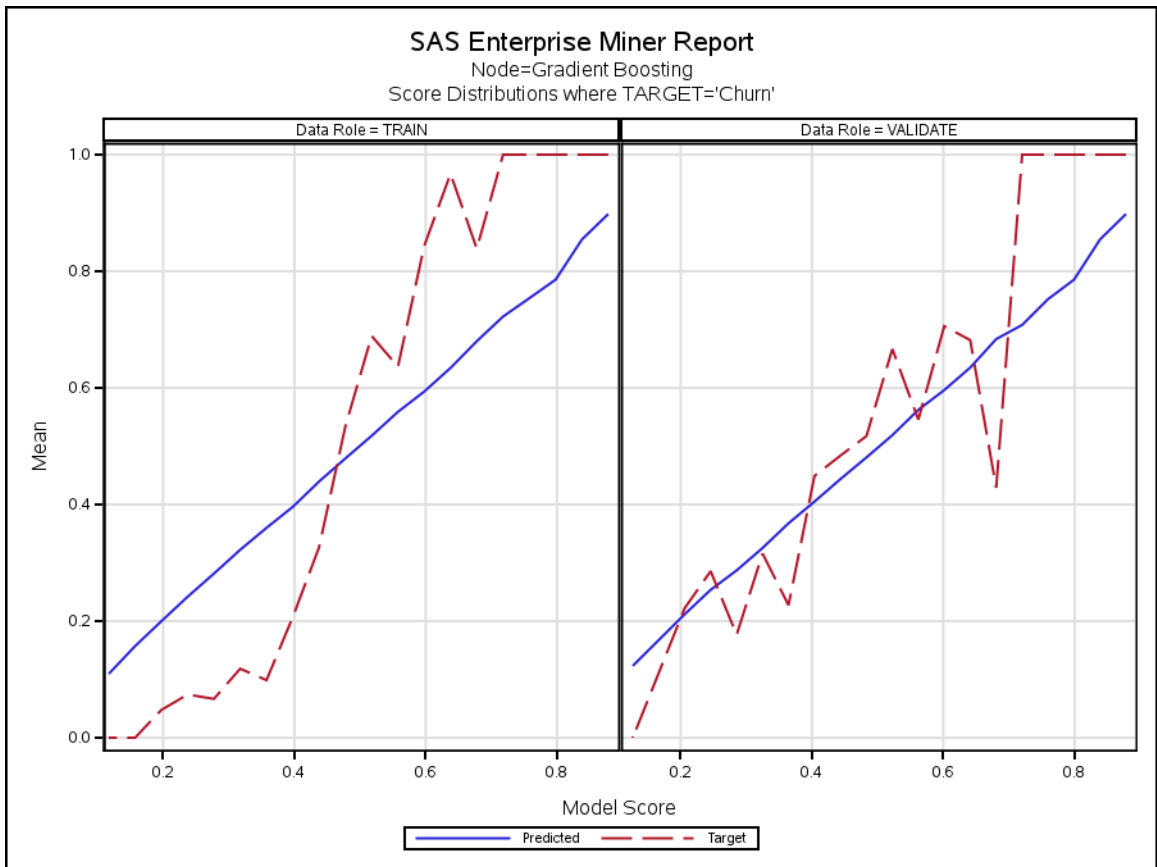
Target=Churn Target Label=''

Label of Statistic	Train	Validation	Test
Sum of Frequencies	1050.00	450.000	.
Sum of Case Weights Times Freq	1050.00	450.000	.
Maximum Absolute Error	0.80	0.803	.
Sum of Squared Errors	198.92	101.105	.
Average Squared Error	0.19	0.225	.
Root Average Squared Error	0.44	0.474	.
Divisor for ASE	1050.00	450.000	.
Total Degrees of Freedom	1050.00	.	.



Node=Gradient Boosting Variable Importance

Variable Name	Label	Number of Splitting Rules	Importance	Validation Importance	Ratio of Validation to Training Importance
IMP_TotalSpent	Imputed TotalSpent	32	1.00000	1.00000	1.00000
Occupation		18	0.80723	0.76661	0.94969
LastPurchaseDate		20	0.77867	0.74011	0.95048
IMP_FavoriteCategory	Imputed FavoriteCategory	15	0.72998	0.80325	1.10036
IMP_Age	Imputed Age	21	0.71176	0.79441	1.11613
IMP_TotalPurchases	Imputed TotalPurchases	17	0.60478	0.69319	1.14617
MembershipLevel		9	0.52829	0.39309	0.74408
FrequencyOfWebsiteVisits		8	0.51109	0.51744	1.01242
Location		9	0.47731	0.38338	0.80321
Gender		1	0.23568	0.00000	0.00000



Node=Gradient Boosting
Score Distributions

Target Variable=Churn Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.858 - 0.898	0.89815	0.89815	0.89815	1.00000	1	1
0.818 - 0.858	0.85454	0.85454	0.85454	1.00000	1	1
0.778 - 0.818	0.78568	0.78568	0.78568	1.00000	1	1
0.738 - 0.778	0.75386	0.77050	0.73861	1.00000	1	1
0.698 - 0.738	0.72233	0.72898	0.70702	1.00000	1	1
0.658 - 0.698	0.68004	0.69742	0.65797	0.83871	1	0
0.618 - 0.658	0.63415	0.65749	0.61874	0.96721	1	0
0.578 - 0.618	0.59369	0.61682	0.57839	0.84337	1	0
0.538 - 0.578	0.55886	0.57724	0.53831	0.63636	1	0
0.498 - 0.538	0.51782	0.53735	0.49827	0.68908	1	0
0.458 - 0.498	0.47898	0.49699	0.45838	0.53383	1	0
0.417 - 0.458	0.43943	0.45643	0.41758	0.32653	1	0
0.377 - 0.417	0.39592	0.41708	0.37777	0.20690	1	0
0.337 - 0.377	0.35991	0.37569	0.33806	0.09877	1	0
0.297 - 0.337	0.32234	0.33617	0.30017	0.11842	1	0
0.257 - 0.297	0.28143	0.29641	0.25837	0.06667	1	0
0.217 - 0.257	0.24182	0.25663	0.22368	0.07407	1	0
0.177 - 0.217	0.19979	0.21427	0.18519	0.04762	1	0
0.137 - 0.177	0.15707	0.15707	0.15707	0.00000	0	0
0.097 - 0.137	0.10956	0.13132	0.09706	0.00000	0	0

Target Variable=Churn Data Role=VALIDATE

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.859 - 0.898	0.89815	0.89815	0.89815	1.00000	1	1
0.819 - 0.859	0.85454	0.85454	0.85454	1.00000	1	1
0.780 - 0.819	0.78568	0.78568	0.78568	1.00000	1	1
0.740 - 0.780	0.75230	0.76296	0.74303	1.00000	1	1
0.700 - 0.740	0.70795	0.70887	0.70702	1.00000	1	1
0.661 - 0.700	0.68365	0.69646	0.67399	0.42857	1	0
0.621 - 0.661	0.63481	0.65797	0.62148	0.68182	1	0
0.582 - 0.621	0.59627	0.61976	0.58231	0.70588	1	0
0.542 - 0.582	0.56234	0.58109	0.54355	0.54545	1	0
0.503 - 0.542	0.51891	0.54137	0.50349	0.66667	1	0
0.463 - 0.503	0.48067	0.50242	0.46422	0.51724	1	0
0.424 - 0.463	0.44359	0.46200	0.42582	0.48387	1	0
0.384 - 0.424	0.40496	0.42334	0.38913	0.44898	1	0
0.344 - 0.384	0.36780	0.38363	0.34514	0.22727	1	0
0.305 - 0.344	0.32545	0.34174	0.30858	0.31579	1	0
0.265 - 0.305	0.28697	0.30283	0.26640	0.17647	1	0
0.226 - 0.265	0.25365	0.26293	0.23459	0.28571	1	0
0.186 - 0.226	0.21177	0.22498	0.19692	0.22222	1	0
0.107 - 0.147	0.12327	0.13132	0.10716	0.00000	0	0

SAS Enterprise Miner Report

Node=Model Comparison
Summary

Node id = MdlComp
Node label = Model Comparison
Meta path = Ids => Impt => Part => Boost => MdlComp
Notes =

Node=Model Comparison
Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	ModelCompare		NumberOfReportedLevels	1E-6		SelectionData	DEFAULT	
AssessAllTargetLevels	N		NumberOfBins	20		SelectionDepth	10	
DecileBin	20		ProfitEpsilon	1E-6		SelectionTable	TRAIN	TABLE
HPCriteria	DEFAULT		RecomputeAssess	N		StatisticUsed	_VASE_	
LiftEpsilon	1E-6		RocChart	Y		TargetLabel		
ModelCriteria	Valid: Average Squared Error		RocEpsilon	0.01		TargetName	Churn	
ModelDescription	Gradient Boosting		RoiEpsilon	1E-6		classViyaCriteria	DEFAULT	
ModelId	Boost		ScoreDistBin	20		intervalViyaCriteria	DEFAULT	
NormalizeReportingVariables	Y		SelectionCriteria	DEFAULT				

Node=Model Comparison
Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Churn

Node=Model Comparison
Fit Statistics Table

Selected Model	Predecessor Node	Model Node	Model Description	Target Variable	Target Label	Selection Criterion: Valid: Average Squared Error	Train: Average Squared Error
Y	Boost	Boost	Gradient Boosting	Churn		0.22468	0.18944
	Tree	Tree	Decision Tree	Churn		0.23568	0.17848
	HPDMForest	HPDMForest	HP Forest	Churn		0.23746	0.21980

