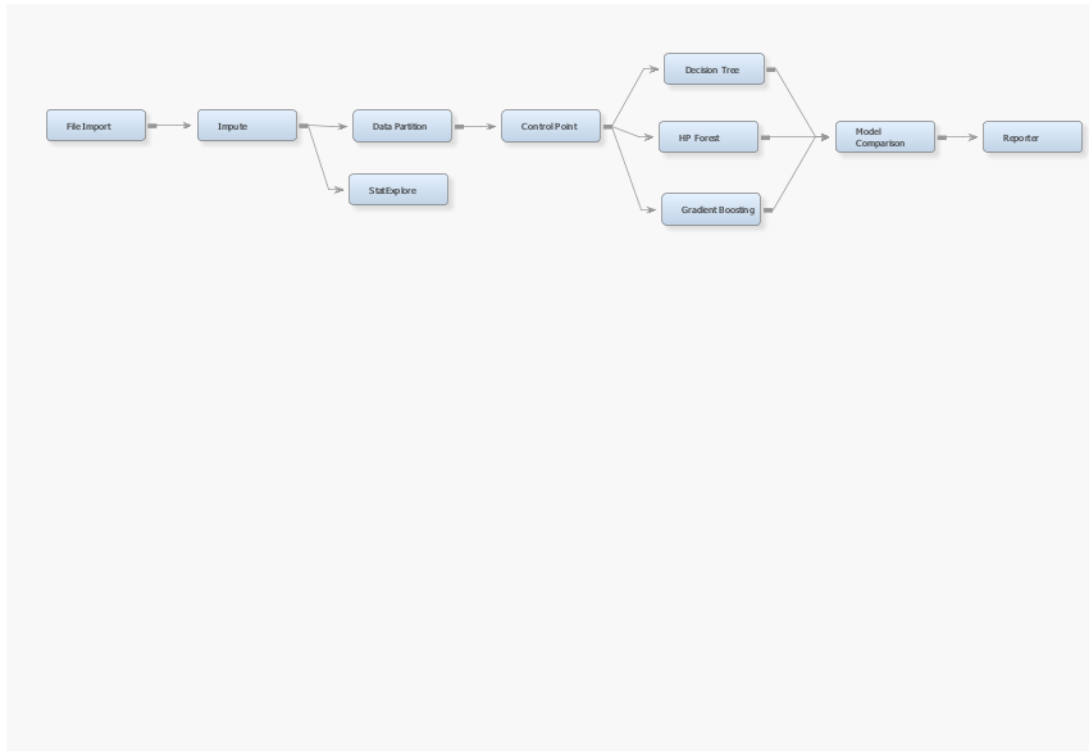# SAS Enterprise Miner Report

User   = u63466158
Date   = 07:24:23 08 January 2024
Project   = ALTERNATIVE ASSESSMENT 1_Xin Dong_22060696
Diagram   = E-Commerce Customer Behaviour Analysis

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=File Import
Summary

Node id = FIMPORT
Node label = File Import
Meta path = FIMPORT
Notes =

Node=File Import
Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	FileImport		GuessRows	500		NameRow	Y	
AccessTable	NoTableName		IFileName	C:\Users\15491\Desktop\WQD7005 DATA MINING\Final Assessment 1\E_Commerce_Customer_Behavior_Dataset.csv		Password	NoPassword	
AdvancedAdvisor	N		ImportType	Local	LOCAL	Role	TRAIN	
Delimiter	,		MaxCols	10000		SkipRows	0	
FileType	csv	XLS	MaxRows	1000000		Summarize	N	

Node=File Import
Data Attributes

Attribute	Value	Attribute	Value	Attribute	Value
Data Name	FIMPORT_DATA	Date Created	07 January 2024 07:44:34	Data Size	132096
Data Type	DATA	Date Modified	07 January 2024 07:44:34	Role	TRAIN
Data Label		Number Rows	1000	Segment	
Engine	V9	Number Columns	14	Data Library	EMWS1

Node=File Import
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	INTERVAL	N	8	BEST12.0	
FavoriteCategory		INPUT	NOMINAL	C	11	$11.	
FrequencyOfWebsiteVisits		INPUT	INTERVAL	N	8	BEST12.0	
Gender		INPUT	NOMINAL	C	6	$6.	
LastPurchaseDate		TIMEID	INTERVAL	N	8	YYMMDD10.0	
Location		INPUT	NOMINAL	C	8	$8.	
MembershipLevel		INPUT	NOMINAL	C	8	$8.	
Occupation		INPUT	NOMINAL	C	13	$13.	
PreferredLoginDevice		REJECTED	NOMINAL	C	8	$8.	
Tenure		INPUT	INTERVAL	N	8	BEST12.0	
TotalPurchases		INPUT	INTERVAL	N	8	BEST12.0	
TotalSpent		INPUT	INTERVAL	N	8	BEST12.0	

Node=File Import
Created Variables List

SAS Enterprise Miner Report

Node=Impute
Summary

Node id = Impt
Node label = Impute
Meta path = FIMPORT => 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	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	5	Age FrequencyOfWebsiteVisits Tenure TotalPurchases TotalSpent
INPUT	NOMINAL	5	FavoriteCategory 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	MEDIAN	IMP_Age	44.00	INPUT	INTERVAL		5
Gender	DISTRIBUTION	IMP_Gender	.	INPUT	NOMINAL		5
MembershipLevel	DISTRIBUTION	IMP_MembershipLevel	.	INPUT	NOMINAL		5
TotalPurchases	MEDIAN	IMP_TotalPurchases	50.00	INPUT	INTERVAL		5
TotalSpent	MEAN	IMP_TotalSpent	12698.71	INPUT	INTERVAL		5

SAS Enterprise Miner Report

**Node=Data Partition
Summary**

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

**Node=Data Partition
Properties**

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	Partition		Method	DEFAULT		TestPct	15	30
ClassDistribution	Y		OutputType	DATA		TrainPct	70	40
IntervalDistribution	Y		RandomSeed	12345		ValidatePct	15	30

**Node=Data Partition
Variable Summary**

Role	Level	Frequency Count	Name
TIMEID	INTERVAL	1	LastPurchaseDate
TARGET	INTERVAL	1	Churn
REJECTED	NOMINAL	1	PreferredLoginDevice
INPUT	INTERVAL	5	FrequencyOfWebsiteVisits IMP_Age IMP_TotalPurchases IMP_TotalSpent Tenure
INPUT	NOMINAL	5	FavoriteCategory IMP_Gender IMP_MembershipLevel Location Occupation
ID	INTERVAL	1	CustomerID

SAS Enterprise Miner Report

**Node=Gradient Boosting
Summary**

Node id = Boost
Node label = Gradient Boosting
Meta path = FIMPORT => 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**

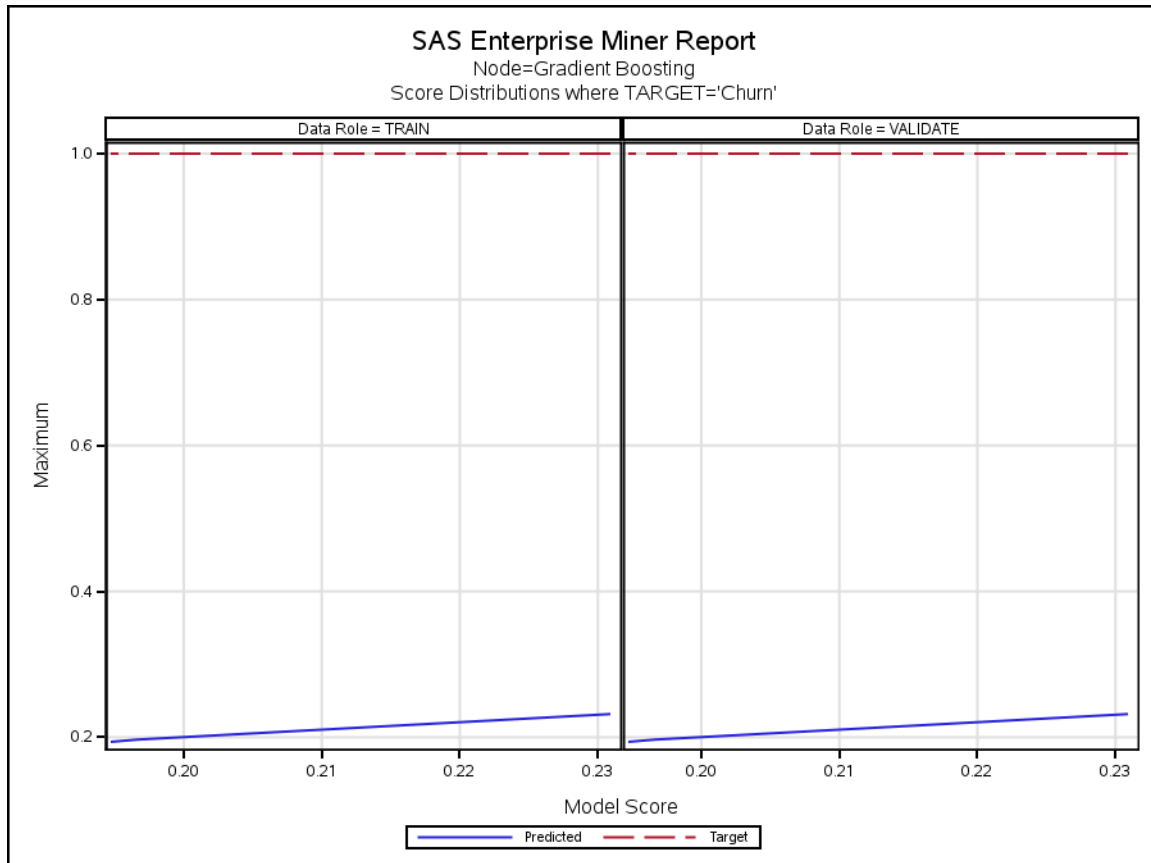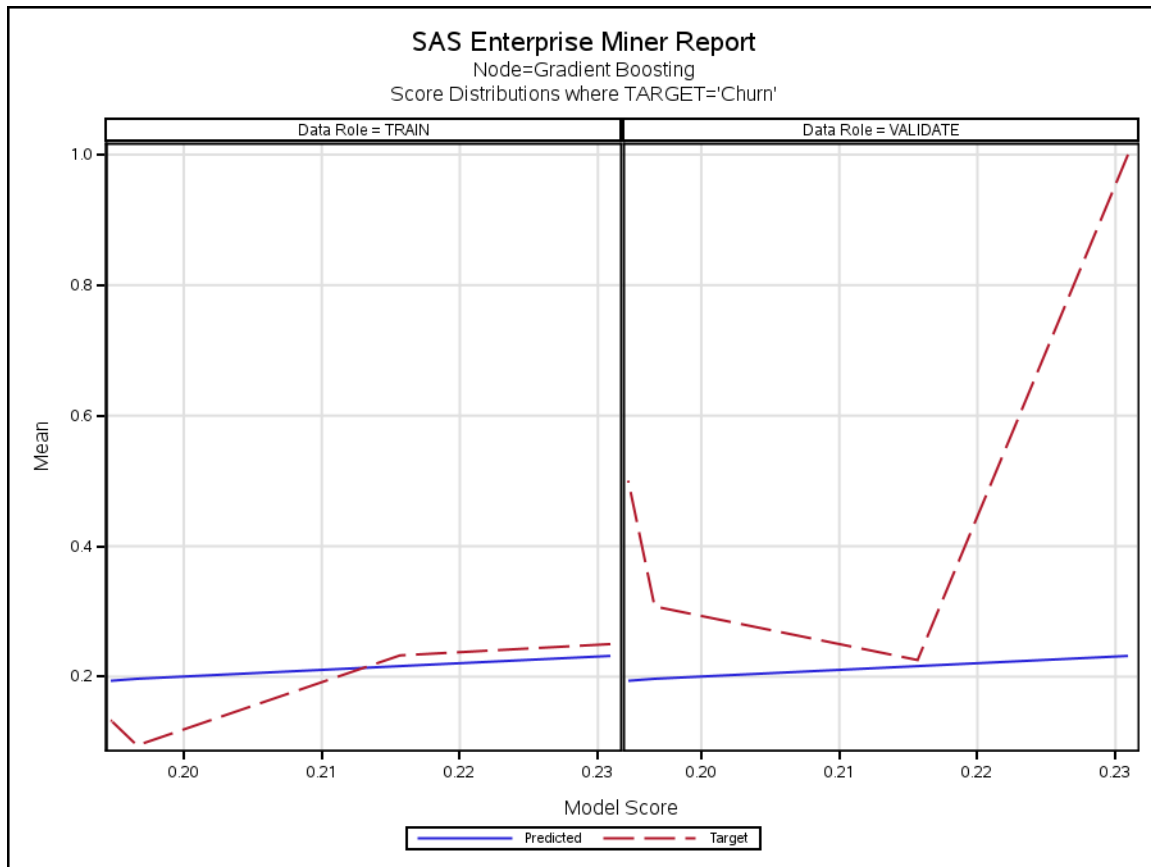| Role	Level	Frequency Count	Name
TIMEID	INTERVAL	1	LastPurchaseDate
TARGET	INTERVAL	1	Churn
INPUT	INTERVAL	5	FrequencyOfWebsiteVisits IMP_Age IMP_TotalPurchases IMP_TotalSpent Tenure
INPUT	NOMINAL	5	FavoriteCategory IMP_Gender IMP_MembershipLevel Location Occupation
ID	INTERVAL	2	CustomerID _dataobs_

**Node=Gradient Boosting
Model Fit Statistics**

Target=Churn Target Label=' '

Label of Statistic	Train	Validation	Test
Sum of Frequencies	700.000	150.000	150.000
Sum of Case Weights Times Freq	700.000	150.000	150.000
Maximum Absolute Error	0.806	0.806	0.806
Sum of Squared Errors	115.638	28.041	24.091
Average Squared Error	0.165	0.187	0.161
Root Average Squared Error	0.406	0.432	0.401
Divisor for ASE	700.000	150.000	150.000
Total Degrees of Freedom	700.000	.	.

SAS Enterprise Miner Report
Node=Gradient Boosting
Subseries Plot
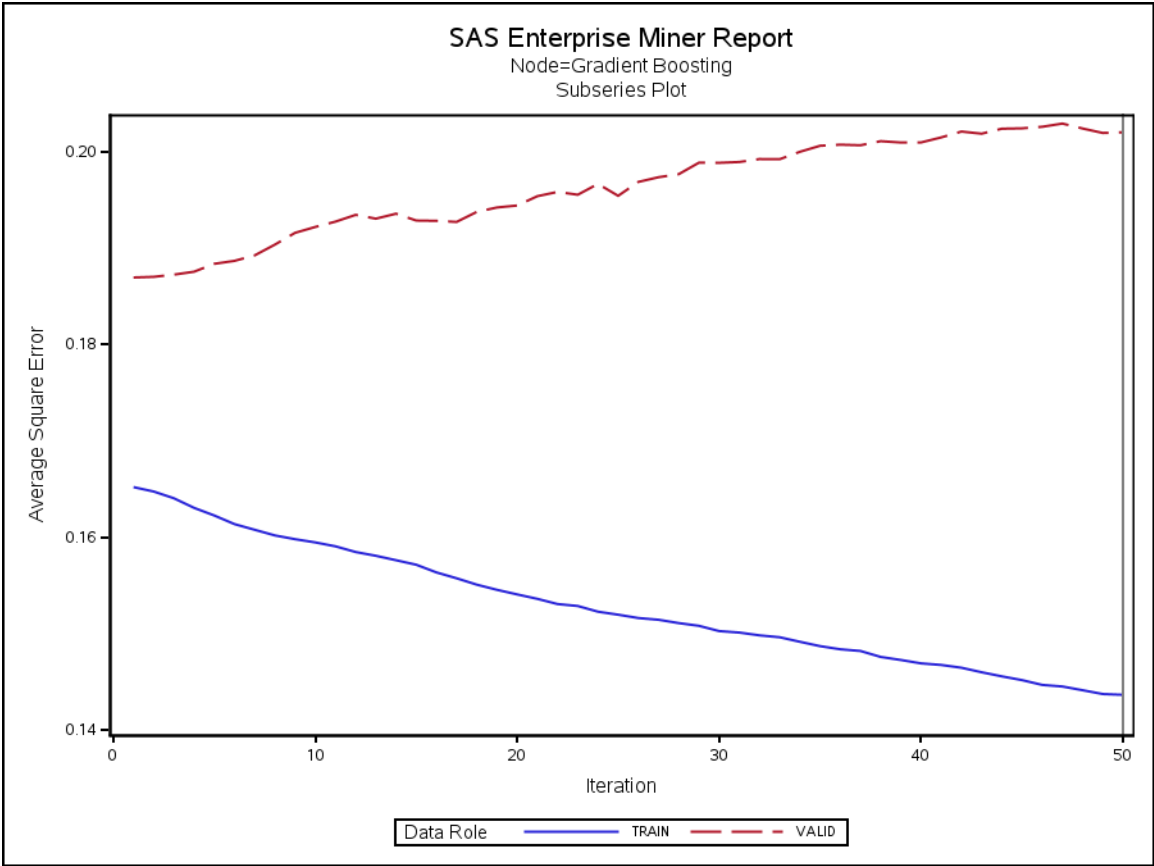
Node=Gradient Boosting
Variable Importance

Variable Name	Label	Number of Splitting Rules	Importance	Validation Importance	Ratio of Validation to Training Importance
IMP_TotalPurchases	Imputed TotalPurchases	3	1	1	1
Tenure		0	0	0	.
FrequencyOfWebsiteVisits		0	0	0	.
IMP_Age	Imputed Age	0	0	0	.
FavoriteCategory		0	0	0	.
IMP_TotalSpent	Imputed TotalSpent	0	0	0	.
IMP_MembershipLevel	Imputed MembershipLevel	0	0	0	.
Location		0	0	0	.
IMP_Gender	Imputed Gender	0	0	0	.
Occupation		0	0	0	.

SAS Enterprise Miner Report
Node=Gradient Boosting
Score Distributions where TARGET='Churn'

SAS Enterprise Miner Report
Node=Gradient Boosting
Score Distributions where TARGET='Churn'

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
0.230 - 0.232	0.23186	0.23186	0.23186	0.25000	1	0
0.215 - 0.217	0.21627	0.21627	0.21627	0.23268	1	0
0.196 - 0.198	0.19684	0.19684	0.19684	0.09474	1	0
0.194 - 0.196	0.19376	0.19376	0.19376	0.13333	1	0

Target Variable=Churn Data Role=VALIDATE

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.230 - 0.232	0.23186	0.23186	0.23186	1.00000	1	1
0.215 - 0.217	0.21627	0.21627	0.21627	0.22556	1	0
0.196 - 0.198	0.19684	0.19684	0.19684	0.30769	1	0
0.194 - 0.196	0.19376	0.19376	0.19376	0.50000	1	0

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target

SAS Enterprise Miner Report

Node=HP Forest
Summary

Node id = HPDMForest
Node label = HP Forest
Meta path = FIMPORT => 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		VARS_TO_TRY	.	
MAXDEPTH	50		RBATOPNUM	25		VIMETHOD	LOSSREDUCTION	

Node=HP Forest
Variable Summary

Role	Level	Frequency Count	Name
TIMEID	INTERVAL	1	LastPurchaseDate
TARGET	INTERVAL	1	Churn
INPUT	INTERVAL	5	FrequencyOfWebsiteVisits IMP_Age IMP_TotalPurchases IMP_TotalSpent Tenure
INPUT	NOMINAL	5	FavoriteCategory IMP_Gender IMP_MembershipLevel Location Occupation
ID	INTERVAL	2	CustomerID _dataobs_

Node=HP Forest
Model Fit Statistics

Target=Churn Target Label=' '

| Label of Statistic	Train	Validation	Test
Average Squared Error	0.050	0.203	0.165
Divisor for ASE	700.000	150.000	150.000
Maximum Absolute Error	0.571	0.916	0.912
Sum of Frequencies	700.000	150.000	150.000
Root Average Squared Error	0.223	0.451	0.407
Sum of Squared Errors	34.813	30.499	24.796

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	90	0.15381	0.32416	0.32059
2	189	0.10209	0.29315	0.22756
3	285	0.08238	0.26155	0.23123
4	378	0.07162	0.24864	0.21897
5	471	0.06823	0.24157	0.21795

Number of Trees	Number of Leaves	Average Square Error (Train)	Average Square Error (Out of Bag)	Average Square Error (Validate)
6	580	0.06461	0.24435	0.21323
7	659	0.06455	0.23892	0.21422
8	745	0.06469	0.23120	0.21052
9	851	0.06099	0.22585	0.20880
10	945	0.05895	0.21724	0.20755
11	1037	0.05934	0.21371	0.20580
12	1124	0.05936	0.21040	0.20473
13	1212	0.05863	0.20987	0.20344
14	1321	0.05780	0.20868	0.20661
15	1415	0.05699	0.20793	0.20613
16	1519	0.05680	0.20613	0.20833
17	1613	0.05659	0.20485	0.20663
18	1714	0.05597	0.20295	0.20550
19	1796	0.05595	0.20022	0.20511
20	1892	0.05571	0.19980	0.20621
21	1982	0.05571	0.19957	0.20576
22	2089	0.05487	0.19845	0.20822
23	2180	0.05519	0.19921	0.20970
24	2287	0.05431	0.19802	0.20987
25	2382	0.05432	0.19808	0.21067
26	2474	0.05408	0.19692	0.20997
27	2572	0.05412	0.19727	0.20995
28	2655	0.05449	0.19680	0.20986
29	2755	0.05426	0.19583	0.20986
30	2856	0.05398	0.19466	0.20905
31	2948	0.05368	0.19360	0.20963
32	3042	0.05367	0.19310	0.20986
33	3122	0.05368	0.19219	0.20858
34	3213	0.05345	0.19136	0.20790
35	3296	0.05351	0.19029	0.20888
36	3402	0.05288	0.18920	0.20938
37	3501	0.05274	0.18896	0.20909
38	3580	0.05290	0.18843	0.20748
39	3660	0.05341	0.18932	0.20722
40	3756	0.05308	0.18867	0.20687
41	3863	0.05265	0.18778	0.20702
42	3953	0.05271	0.18731	0.20671
43	4053	0.05259	0.18725	0.20651
44	4146	0.05240	0.18693	0.20623
45	4225	0.05256	0.18600	0.20573
46	4326	0.05216	0.18506	0.20575
47	4412	0.05232	0.18493	0.20558
48	4503	0.05223	0.18439	0.20614
49	4596	0.05215	0.18432	0.20622
50	4707	0.05198	0.18427	0.20711
51	4803	0.05179	0.18417	0.20625
52	4909	0.05140	0.18374	0.20698
53	5010	0.05133	0.18437	0.20648
54	5111	0.05121	0.18396	0.20605
55	5208	0.05113	0.18357	0.20573
56	5302	0.05109	0.18325	0.20519
57	5404	0.05095	0.18298	0.20549

| Number of Trees	Number of Leaves	Average Square Error (Train)	Average Square Error (Out of Bag)	Average Square Error (Validate)
58	5507	0.05103	0.18335	0.20526
59	5597	0.05100	0.18244	0.20571
60	5696	0.05093	0.18209	0.20526
61	5791	0.05083	0.18204	0.20497
62	5889	0.05085	0.18228	0.20470
63	5980	0.05075	0.18197	0.20488
64	6076	0.05079	0.18224	0.20494
65	6158	0.05072	0.18190	0.20469
66	6255	0.05052	0.18174	0.20491
67	6354	0.05053	0.18145	0.20498
68	6447	0.05058	0.18149	0.20554
69	6539	0.05057	0.18099	0.20506
70	6641	0.05038	0.18037	0.20497
71	6742	0.05053	0.18089	0.20507
72	6844	0.05045	0.18088	0.20453
73	6963	0.05025	0.18092	0.20470
74	7055	0.05019	0.18104	0.20397
75	7155	0.05007	0.18111	0.20398
76	7257	0.05002	0.18128	0.20354
77	7355	0.05001	0.18116	0.20406
78	7460	0.04996	0.18107	0.20378
79	7546	0.05003	0.18093	0.20411
80	7638	0.05001	0.18106	0.20460
81	7737	0.04999	0.18104	0.20452
82	7839	0.04984	0.18105	0.20419
83	7925	0.04994	0.18108	0.20481
84	8023	0.04979	0.18070	0.20477
85	8117	0.04980	0.18069	0.20481
86	8225	0.04979	0.18100	0.20472
87	8311	0.05000	0.18125	0.20528
88	8415	0.04982	0.18079	0.20510
89	8518	0.04990	0.18120	0.20503
90	8623	0.04989	0.18142	0.20462
91	8717	0.04997	0.18173	0.20434
92	8809	0.04992	0.18150	0.20392
93	8917	0.04984	0.18167	0.20375
94	9026	0.04968	0.18137	0.20358
95	9115	0.04969	0.18125	0.20358
96	9197	0.04976	0.18121	0.20321
97	9296	0.04975	0.18116	0.20299
98	9394	0.04977	0.18117	0.20320
99	9502	0.04979	0.18149	0.20287
100	9604	0.04973	0.18155	0.20332

SAS Enterprise Miner Report
Node=HP Forest
Iteration Plot
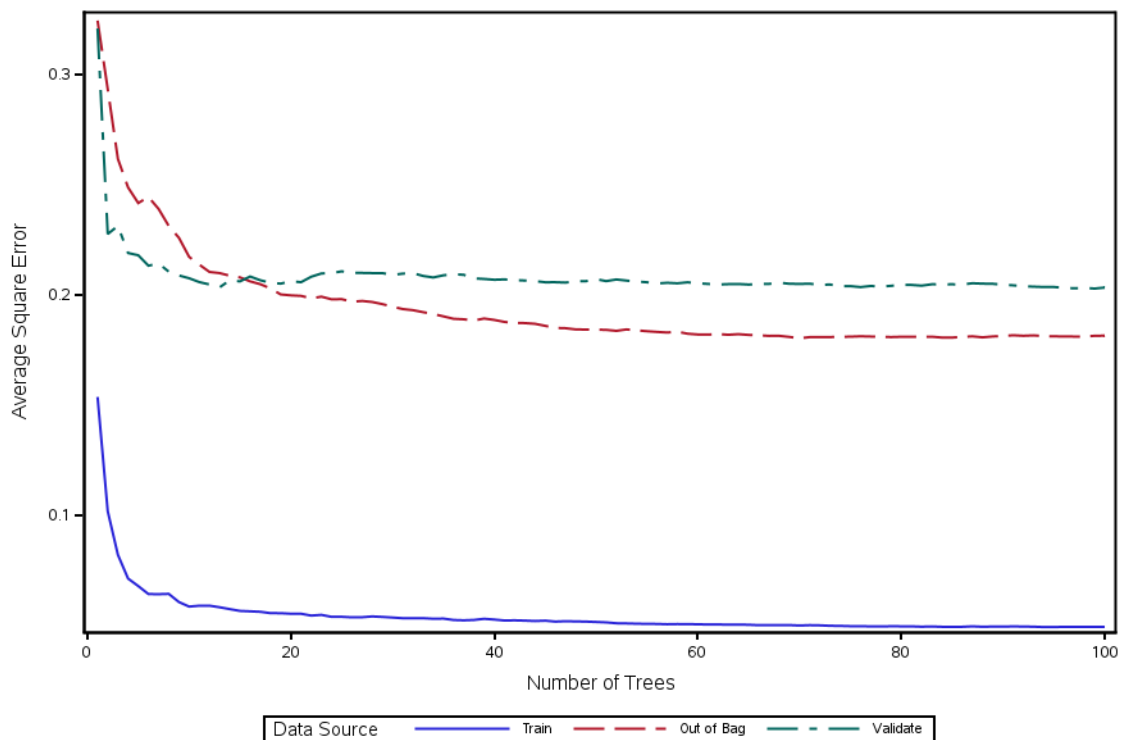
SAS Enterprise Miner Report
Node=HP Forest
Leaf Plot
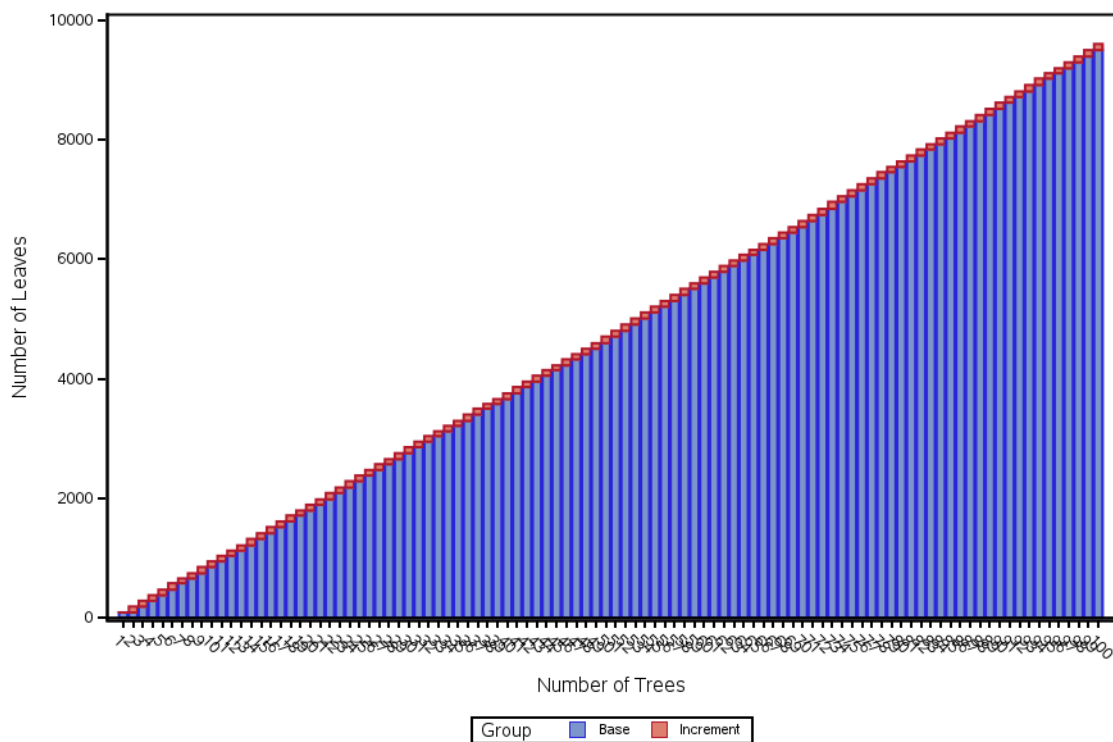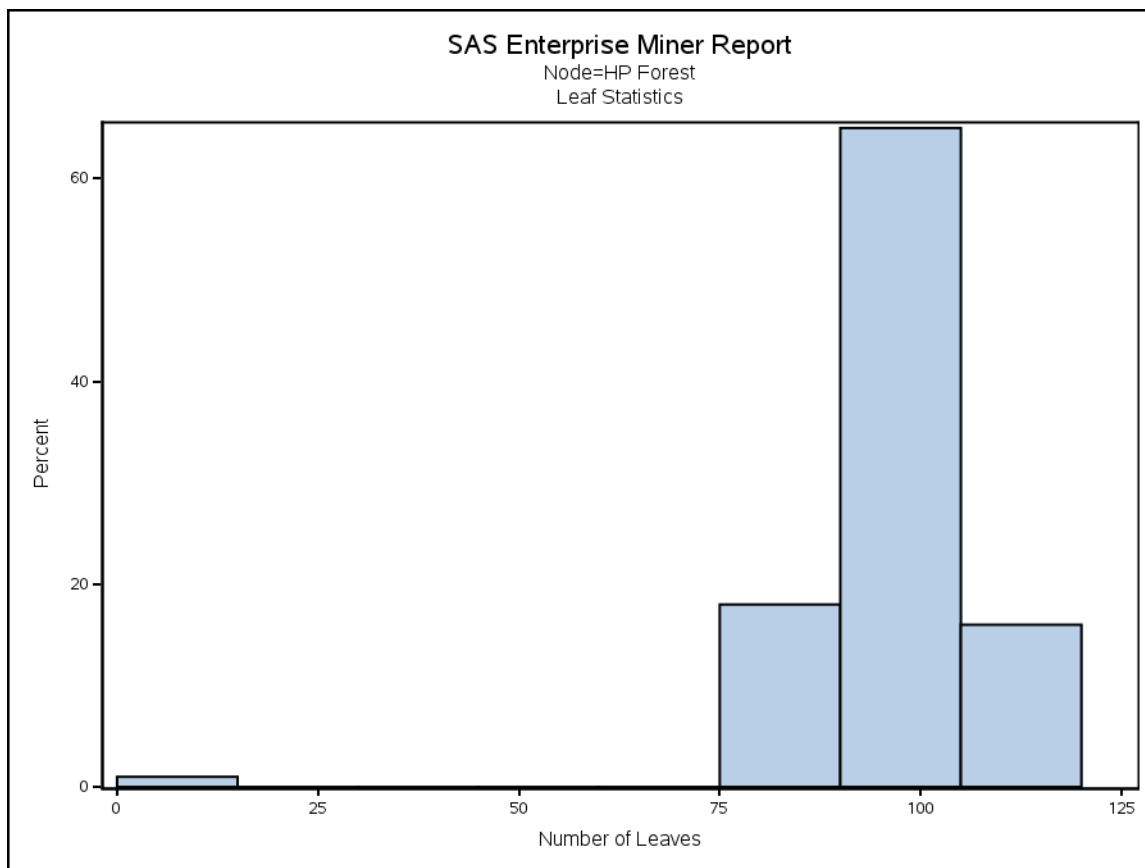
Node=HP Forest
Variable Importance

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
IMP_TotalSpent	2442	0.035400	0.070305	-0.04011	-0.005804	-0.03735	-0.001786	Imputed TotalSpent
IMP_Age	1659	0.026009	0.051846	-0.03159	-0.004716	-0.03265	-0.006774	Imputed Age
FrequencyOfWebsiteVisits	1598	0.022927	0.045823	-0.02566	-0.002353	-0.02507	-0.002711	
Tenure	1071	0.012032	0.023785	-0.01376	-0.001526	-0.01340	-0.000306	
IMP_TotalPurchases	987	0.016182	0.032377	-0.01741	-0.000713	-0.01703	-0.001803	Imputed TotalPurchases
FavoriteCategory	439	0.004697	0.009482	-0.00502	-0.000459	-0.00666	-0.002412	
IMP_Gender	420	0.004094	0.008243	-0.00436	0.000097072	-0.00506	0.000208	Imputed Gender
IMP_MembershipLevel	393	0.003715	0.007884	-0.00404	0.000407	-0.00669	-0.002669	Imputed MembershipLevel
Location	281	0.003621	0.007344	-0.00266	0.000359	-0.00280	0.001198	
Occupation	214	0.002513	0.005342	-0.00260	-0.000020681	-0.00232	0.001910	
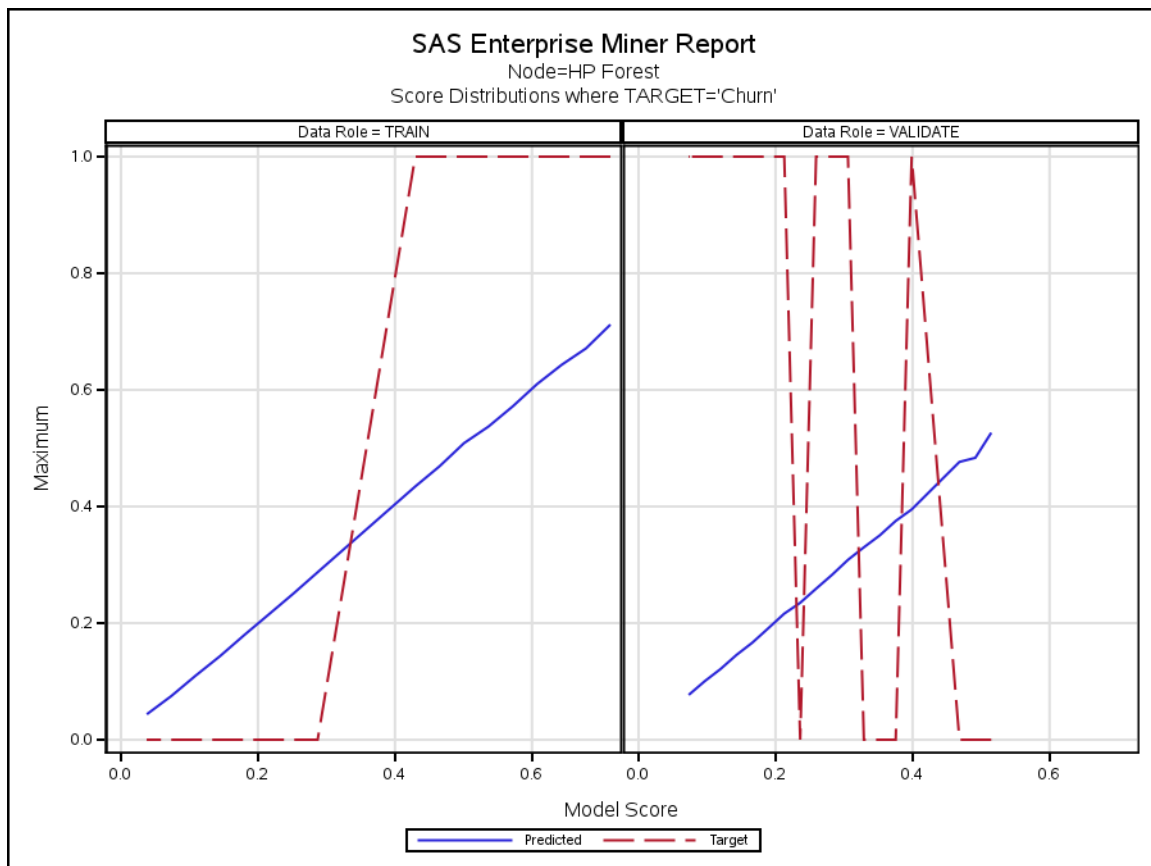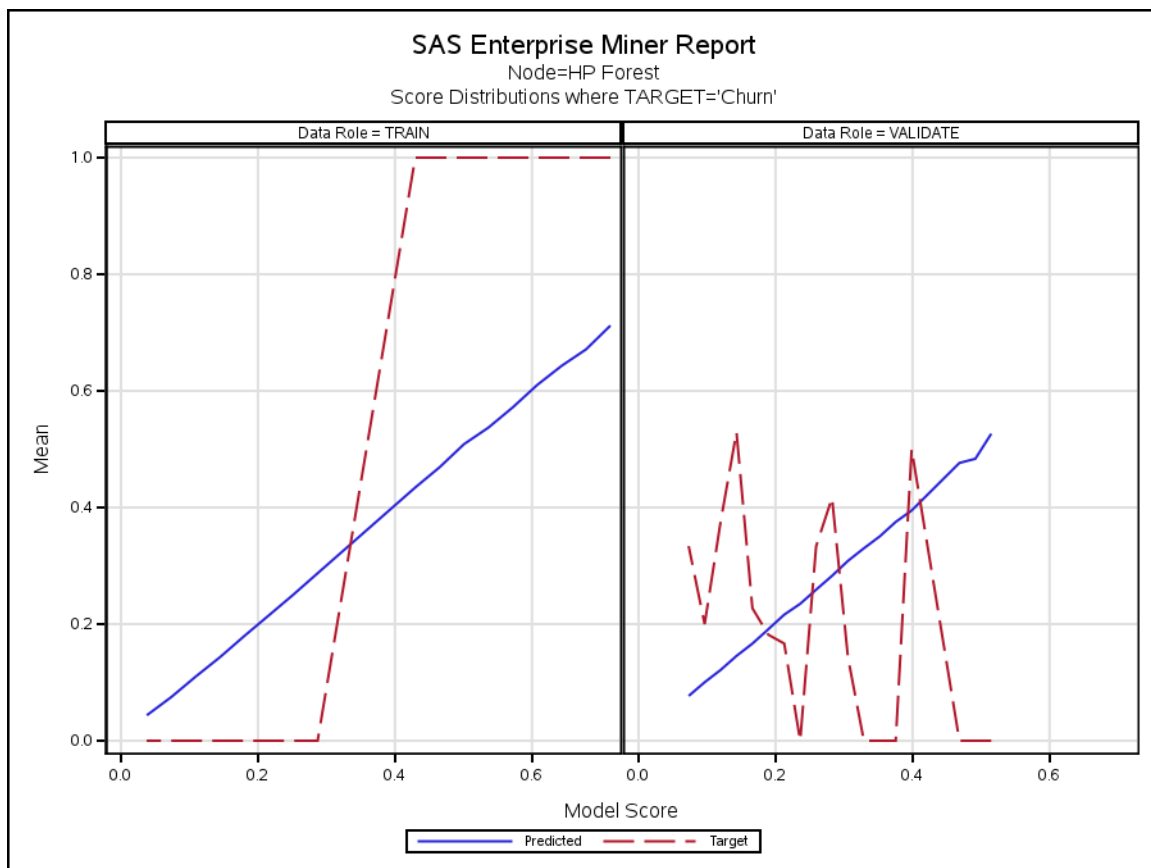
Node=HP Forest
Score Distributions

Target Variable=Churn Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.697 - 0.732	0.71200	0.73228	0.70203	1	1	1
0.661 - 0.697	0.67114	0.68325	0.66166	1	1	1
0.625 - 0.661	0.64293	0.66102	0.62581	1	1	1
0.590 - 0.625	0.61015	0.62537	0.59218	1	1	1
0.554 - 0.590	0.57183	0.58939	0.55529	1	1	1
0.519 - 0.554	0.53704	0.55315	0.52074	1	1	1
0.483 - 0.519	0.50866	0.51723	0.49615	1	1	1
0.447 - 0.483	0.46908	0.48284	0.45605	1	1	1
0.412 - 0.447	0.43429	0.43978	0.42881	1	1	1
0.269 - 0.305	0.28728	0.28796	0.28660	0	0	0
0.234 - 0.269	0.25042	0.26872	0.23692	0	0	0
0.198 - 0.234	0.21502	0.23296	0.19960	0	0	0
0.162 - 0.198	0.17980	0.19800	0.16257	0	0	0
0.127 - 0.162	0.14341	0.16204	0.12717	0	0	0
0.091 - 0.127	0.10993	0.12672	0.09210	0	0	0
0.056 - 0.091	0.07486	0.09090	0.05561	0	0	0
0.020 - 0.056	0.04370	0.05491	0.01996	0	0	0

Target Variable=Churn Data Role=VALIDATE

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.503 - 0.527	0.52651	0.52651	0.52651	0.00000	0	0
0.480 - 0.503	0.48353	0.48353	0.48353	0.00000	0	0
0.457 - 0.480	0.47643	0.47643	0.47643	0.00000	0	0
0.387 - 0.410	0.39491	0.39555	0.39426	0.50000	1	0
0.364 - 0.387	0.37528	0.37528	0.37528	0.00000	0	0
0.341 - 0.364	0.35053	0.35497	0.34764	0.00000	0	0
0.317 - 0.341	0.33002	0.33589	0.31937	0.00000	0	0
0.294 - 0.317	0.30849	0.31622	0.29922	0.14286	1	0
0.271 - 0.294	0.28280	0.29184	0.27154	0.41667	1	0
0.248 - 0.271	0.25908	0.26866	0.24827	0.33333	1	0
0.224 - 0.248	0.23484	0.24419	0.22687	0.00000	0	0
0.201 - 0.224	0.21627	0.22397	0.20673	0.16667	1	0
0.178 - 0.201	0.19127	0.20009	0.18039	0.18182	1	0
0.155 - 0.178	0.16659	0.17728	0.15514	0.22727	1	0
0.131 - 0.155	0.14545	0.15286	0.13439	0.52941	1	0
0.108 - 0.131	0.12132	0.12942	0.11365	0.37500	1	0
0.085 - 0.108	0.10030	0.10723	0.09481	0.20000	1	0
0.062 - 0.085	0.07686	0.08468	0.06162	0.33333	1	0

SAS Enterprise Miner Report

Node=Decision Tree
Summary

Node id = Tree
Node label = Decision Tree
Meta path = FIMPORT => 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	8	5	ProfitLoss	NONE	
AssessPercentage	0.25		Leafid	Y		RASE	N	
CV	N		Maxbranch	10	2	SampleMethod	RANDOM	
CVNIter	10		Maxdepth	10	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	LARGEST	ASSESSMENT
Dummy	N		Nsurrs	4	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

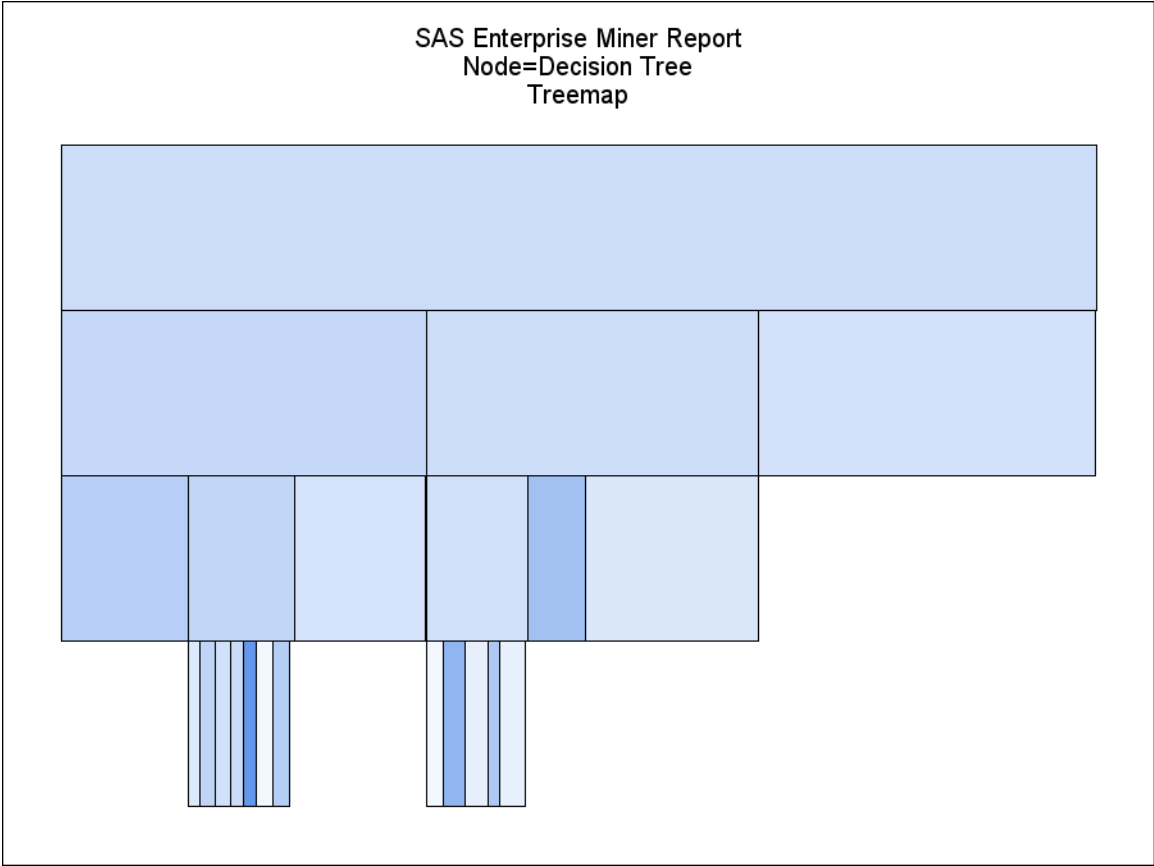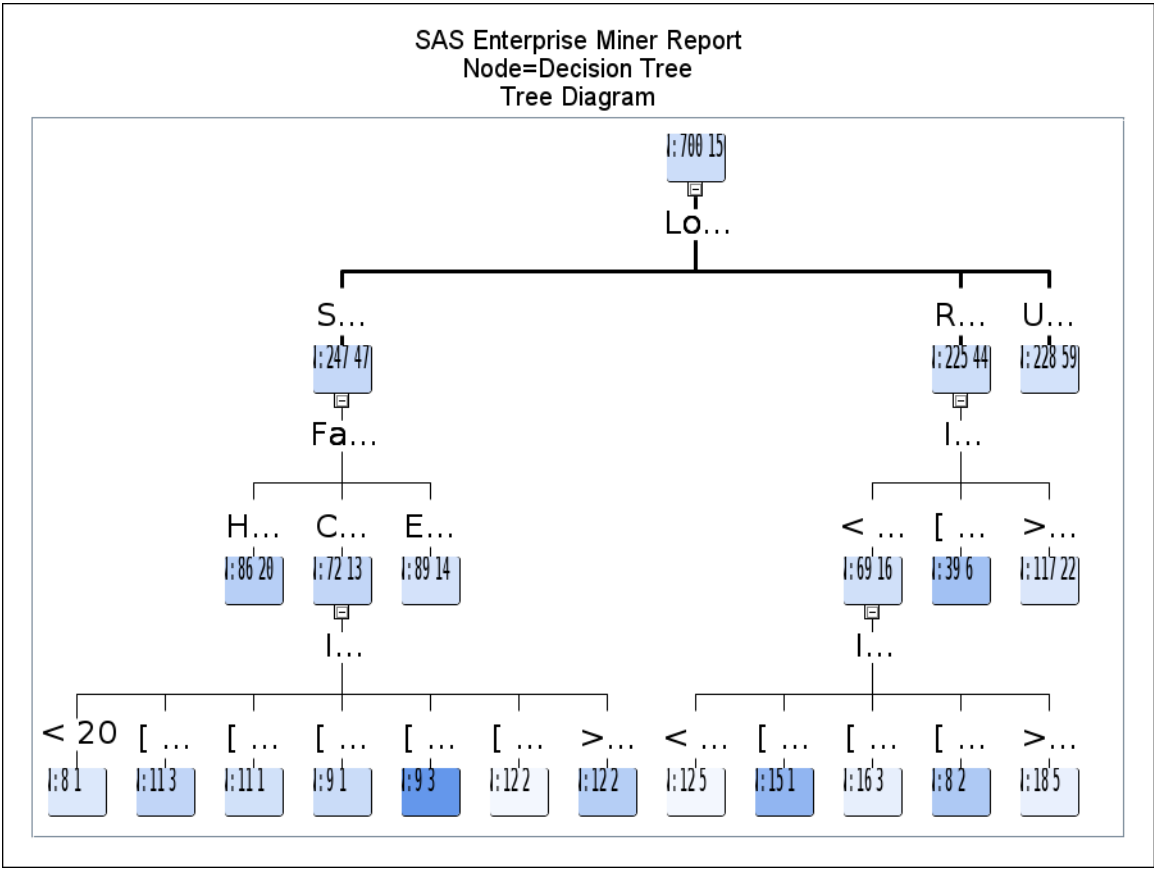| Role	Level	Frequency Count	Name
TIMEID	INTERVAL	1	LastPurchaseDate
TARGET	INTERVAL	1	Churn
INPUT	INTERVAL	5	FrequencyOfWebsiteVisits IMP_Age IMP_TotalPurchases IMP_TotalSpent Tenure
INPUT	NOMINAL	5	FavoriteCategory IMP_Gender IMP_MembershipLevel Location Occupation
ID	INTERVAL	2	CustomerID _dataobs_

Node=Decision Tree
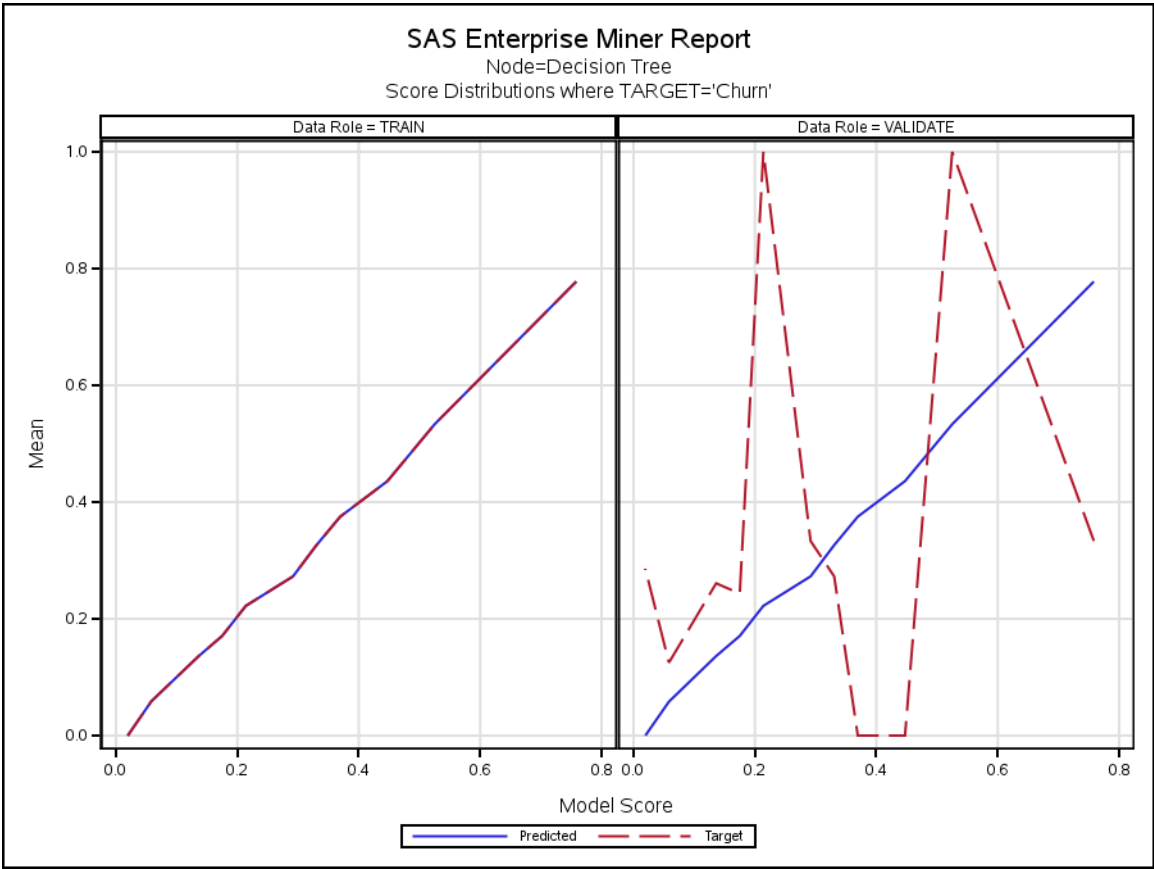## Model Fit Statistics
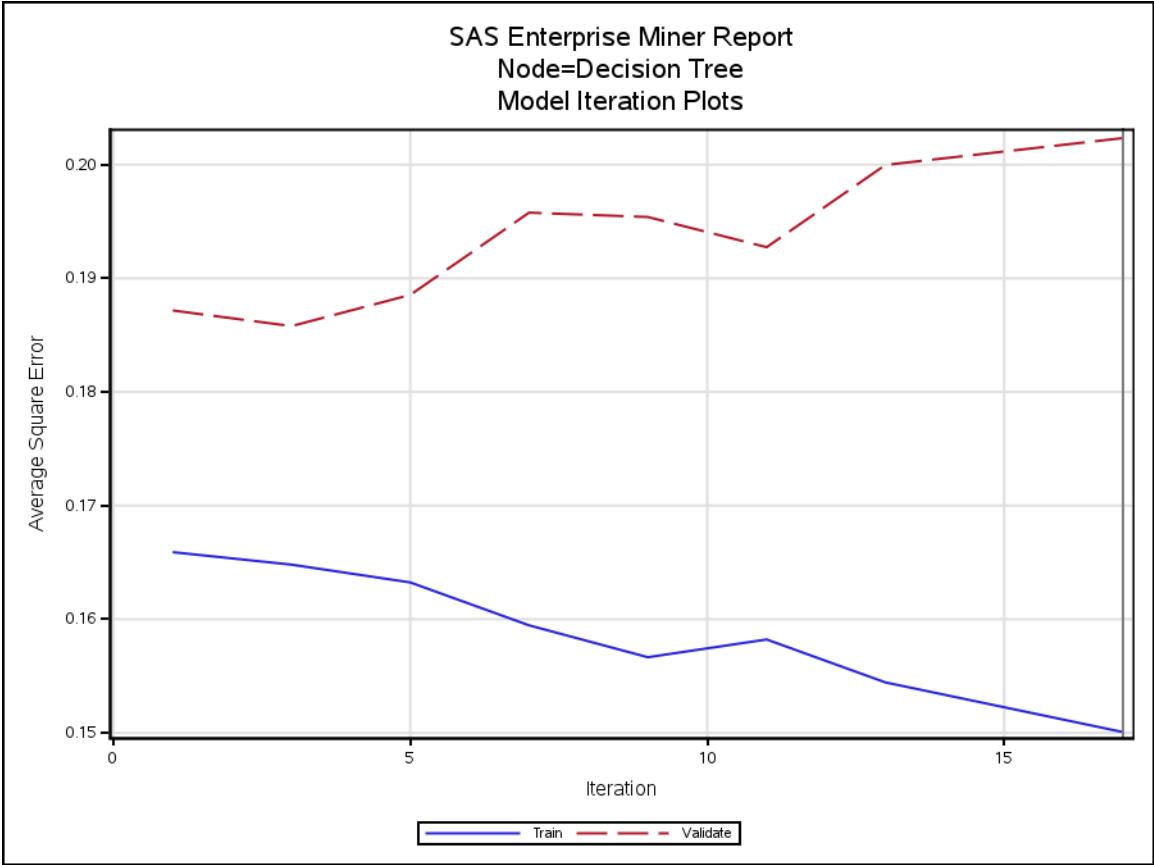
Target=Churn Target Label=' '

Label of Statistic	Train	Validation	Test
Sum of Frequencies	700.000	150.000	150.000
Maximum Absolute Error	0.944	1.000	1.000
Sum of Squared Errors	105.048	30.351	27.644
Average Squared Error	0.150	0.202	0.184
Root Average Squared Error	0.387	0.450	0.429

Target=Churn Target Label=' '

Label of Statistic	Train	Validation	Test
Divisor for ASE	700.000	150.000	150.000
Total Degrees of Freedom	700.000	.	.
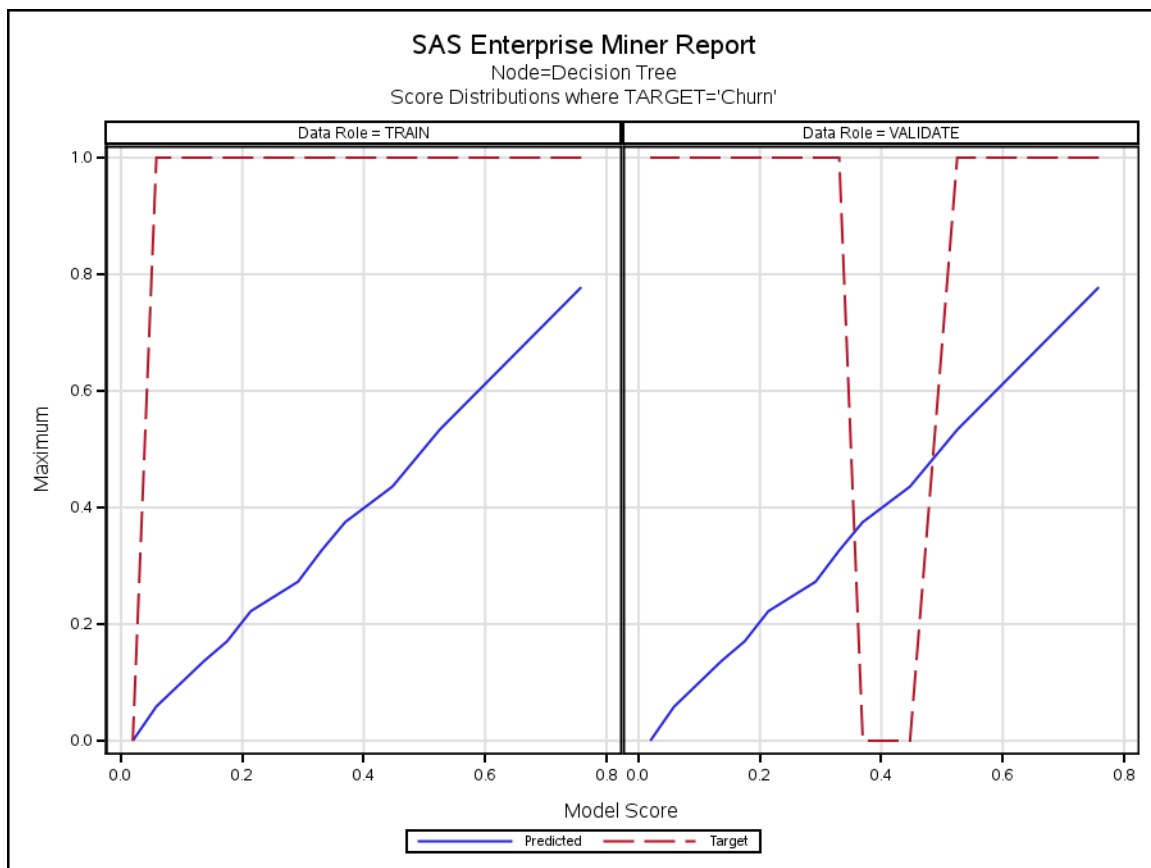
SAS Enterprise Miner Report
Node=Decision Tree
Tree Diagram

SAS Enterprise Miner Report
Node=Decision Tree
Treemap

SAS Enterprise Miner Report
Node=Decision Tree
Model Iteration Plots

SAS Enterprise Miner Report
Node=Decision Tree
Score Distributions where TARGET='Churn'

SAS Enterprise Miner Report
Node=Decision Tree
Score Distributions where TARGET='Churn'

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
0.739 - 0.778	0.77778	0.77778	0.77778	0.77778	1	0
0.506 - 0.544	0.53333	0.53333	0.53333	0.53333	1	0
0.428 - 0.467	0.43590	0.43590	0.43590	0.43590	1	0
0.350 - 0.389	0.37500	0.37500	0.37500	0.37500	1	0
0.311 - 0.350	0.32653	0.33333	0.32558	0.32653	1	0
0.272 - 0.311	0.27273	0.27273	0.27273	0.27273	1	0
0.194 - 0.233	0.22222	0.22222	0.22222	0.22222	1	0
0.156 - 0.194	0.17073	0.18182	0.16854	0.17073	1	0
0.117 - 0.156	0.13600	0.13675	0.12500	0.13600	1	0
0.039 - 0.078	0.05882	0.06250	0.05556	0.05882	1	0
0.000 - 0.039	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
0.739 - 0.778	0.77778	0.77778	0.77778	0.33333	1	0
0.506 - 0.544	0.53333	0.53333	0.53333	1.00000	1	1
0.428 - 0.467	0.43590	0.43590	0.43590	0.00000	0	0
0.350 - 0.389	0.37500	0.37500	0.37500	0.00000	0	0
0.311 - 0.350	0.32629	0.33333	0.32558	0.27273	1	0
0.272 - 0.311	0.27273	0.27273	0.27273	0.33333	1	0
0.194 - 0.233	0.22222	0.22222	0.22222	1.00000	1	1
0.156 - 0.194	0.17072	0.18182	0.16854	0.24324	1	0
0.117 - 0.156	0.13624	0.13675	0.12500	0.26087	1	0
0.039 - 0.078	0.05816	0.06250	0.05556	0.12500	1	0
0.000 - 0.039	0.00000	0.00000	0.00000	0.28571	1	0

SAS Enterprise Miner Report

**Node=Model Comparison
Summary**

Node id = MdlComp
Node label = Model Comparison
Meta path = FIMPORT => 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		0.18694	0.16520
	Tree	Tree	Decision Tree	Churn		0.20234	0.15007
	HPDMForest	HPDMForest	HP Forest	Churn		0.20332	0.04973

SAS Enterprise Miner Report
Node=Model Comparison
Multiple Model Assessment Scores where DataRole=TEST
TARGET='Churn'
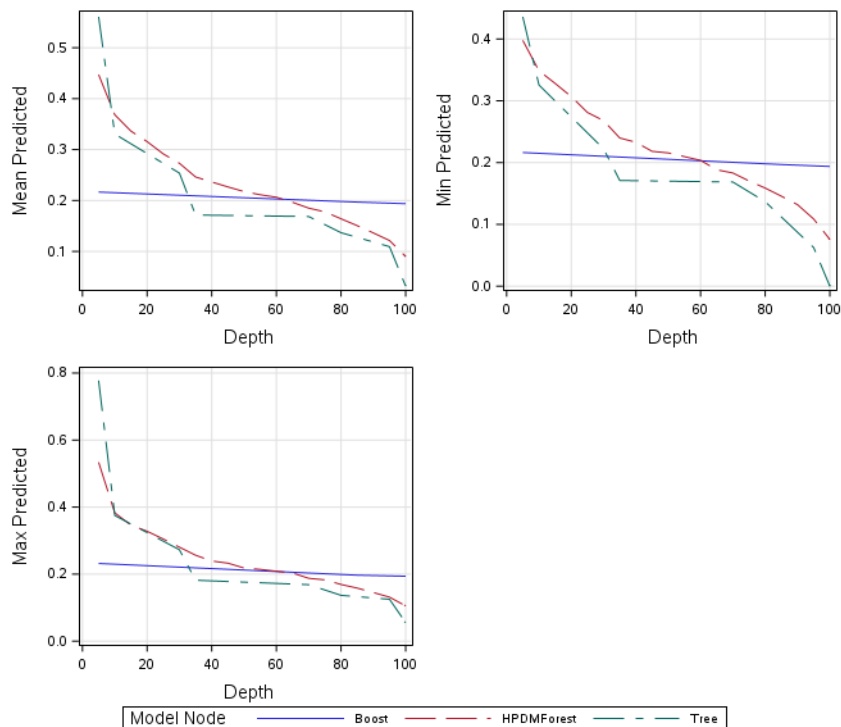
Model Node — Boost — HPDMForest — Tree

SAS Enterprise Miner Report
Node=Model Comparison
Multiple Model Assessment Scores where DataRole=TRAIN
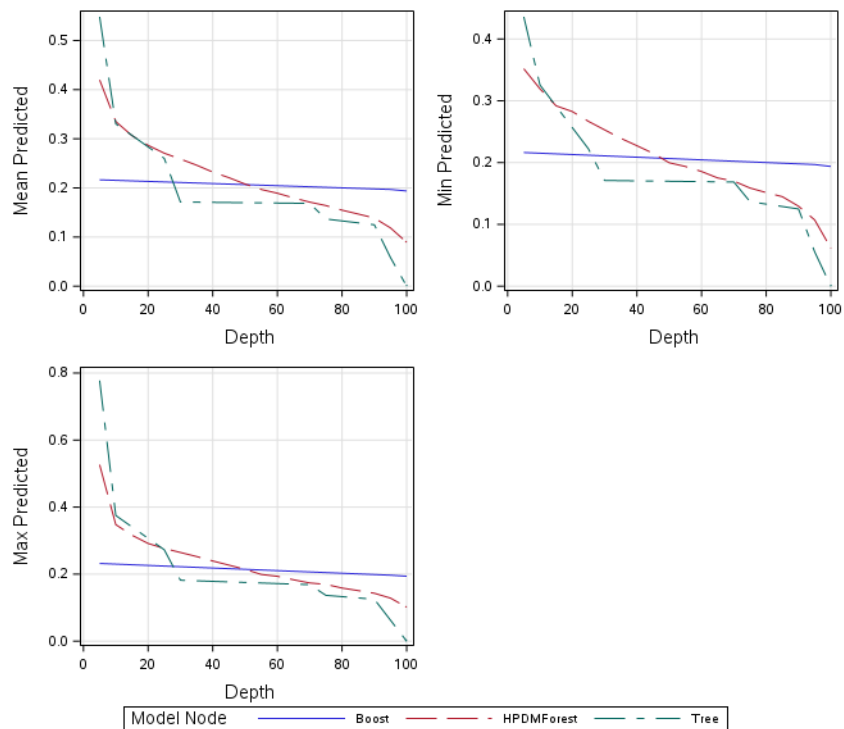TARGET='Churn'
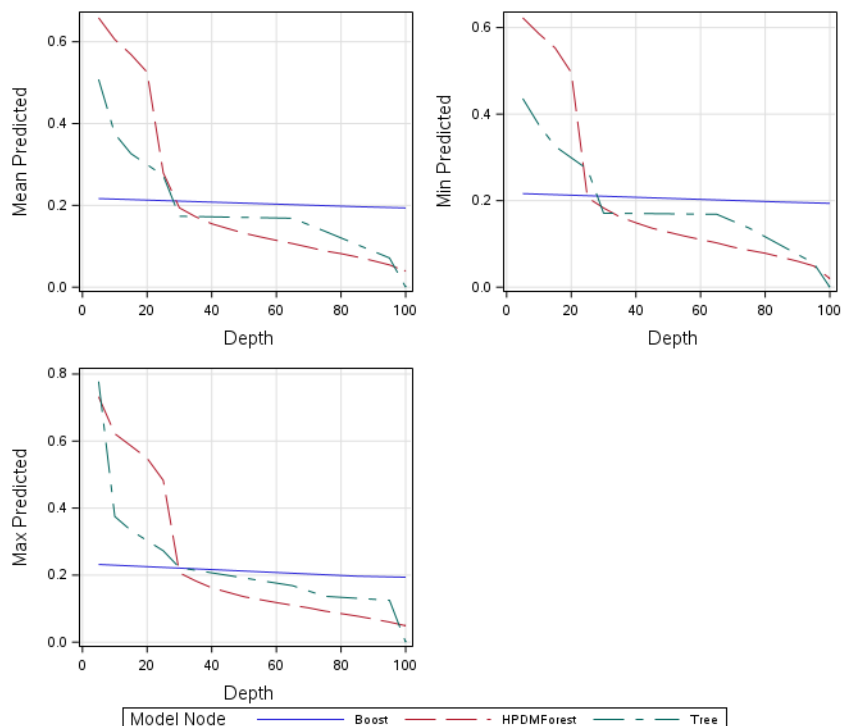
Model Node — Boost — HPDMForest — Tree

SAS Enterprise Miner Report
Node=Model Comparison
Multiple Model Assessment Scores where DataRole=VALIDATE
TARGET='Churn'

End of Report