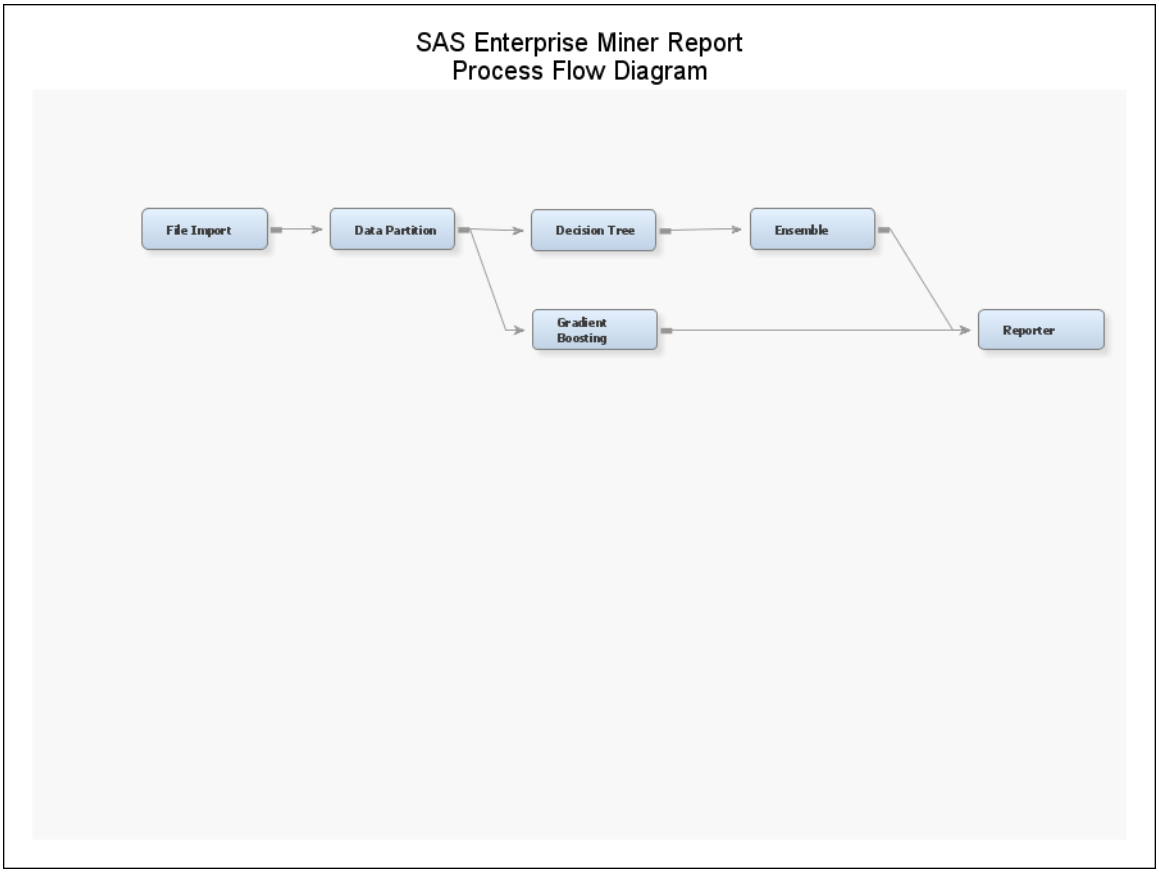
SAS Enterprise Miner Report

User = mac
Date = 14:39:48 January 08
Project = zym
Diagram = customer behaviour

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

Format = PDF
Style = LISTING



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	E:\um sem2\wqd7005\case study\Customer_Behaviour.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	07Jan2023:16:48:09	Data Size	66560
Data Type	DATA	Date Modified	07Jan2023:16:48:09	Role	TRAIN
Data Label		Number Rows	252	Segment	
Engine	V9	Number Columns	12	Data Library	EMWS1

Node=File Import
Variables List

Name	Label	Role	Level	Type	Length	Format	Creator
Age		INPUT	NOMINAL	C	4	$4.	
Churn		TARGET	NOMINAL	C	3	$3.	
CustomerConsumptionLevel		INPUT	NOMINAL	C	3	$3.	
CustomerID		ID	NOMINAL	C	5	$5.	
FinancialStatus		INPUT	NOMINAL	C	13	$13.	
Gender		INPUT	NOMINAL	C	8	$8.	
Location		INPUT	NOMINAL	C	19	$19.	
MaritalStatus		INPUT	NOMINAL	C	13	$13.	
ProductCategoryPerferred		INPUT	NOMINAL	C	58	$58.	
ProductSelectionTime		INPUT	NOMINAL	C	35	$35.	
PurchaseFrequency		INPUT	NOMINAL	C	3	$3.	
TotalSpend		INPUT	NOMINAL	C	8	$8.	

Node=File Import
Created Variables List

SAS Enterprise Miner Report

Node=Data Partition
Summary

Node id = Part
Node label = Data Partition
Meta path = FIMPORT => 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	60	40
IntervalDistribution	Y		RandomSeed	12345		ValidatePct	40	30

Node=Data Partition
Variable Summary

Role	Level	Frequency Count	Name
TARGET	NOMINAL	1	Churn
INPUT	NOMINAL	10	Age CustomerConsumptionLevel FinancialStatus Gender Location MaritalStatus ProductCategoryPerferred ProductSelectionTime PurchaseFrequency TotalSpend
ID	NOMINAL	1	CustomerID

SAS Enterprise Miner Report

Node=Decision Tree
Summary

Node id = Tree
Node label = Decision Tree
Meta path = FIMPORT => 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	
CVNIter	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	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	

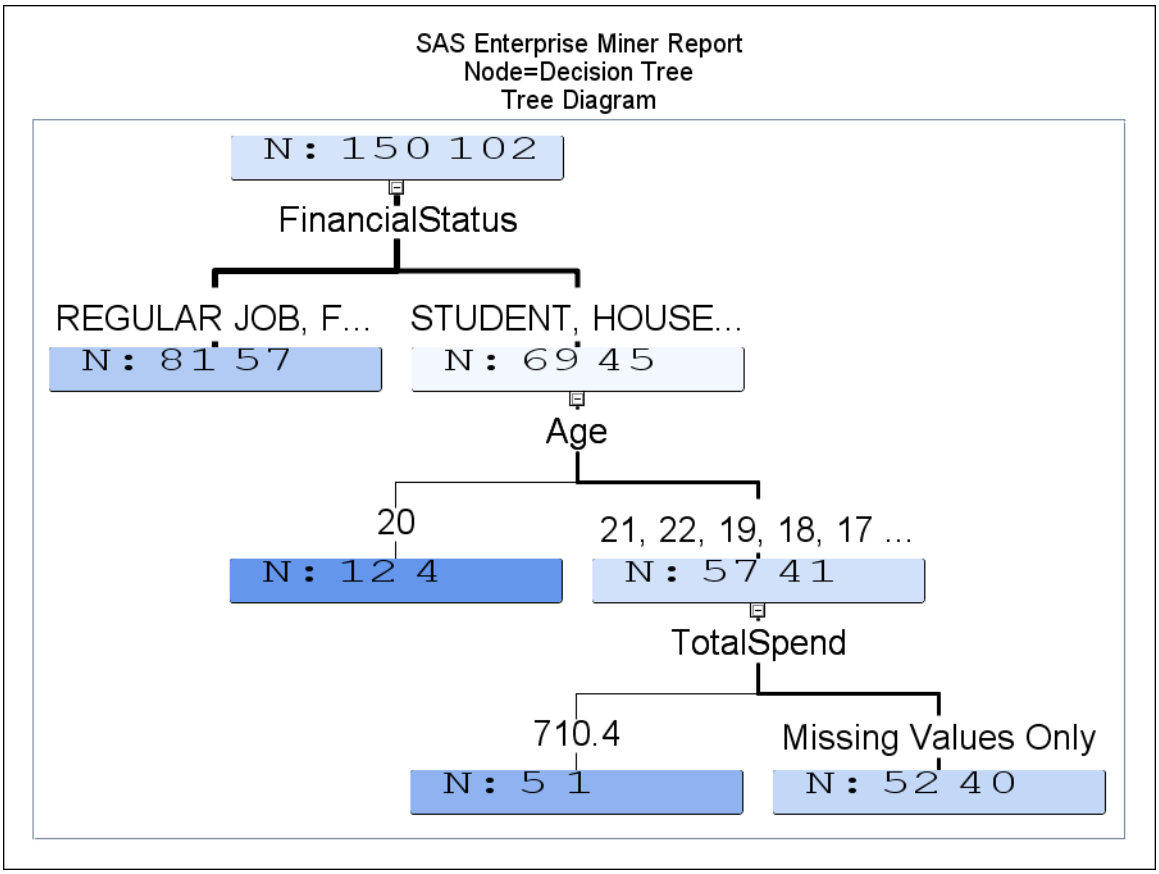
Node=Decision Tree
Variable Summary

Role	Level	Frequency Count	Name
TARGET	NOMINAL	1	Churn
INPUT	NOMINAL	10	Age CustomerConsumptionLevel FinancialStatus Gender Location MaritalStatus ProductCategoryPerferred ProductSelectionTime PurchaseFrequency TotalSpend
ID	INTERVAL	1	_dataobs_

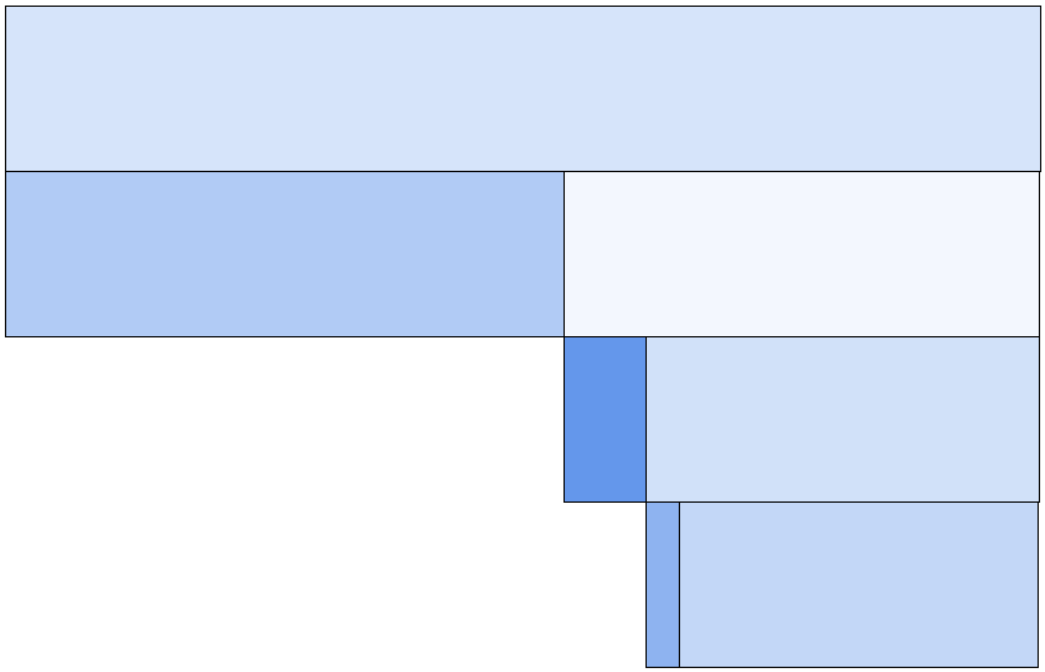
Node=Decision Tree
Model Fit Statistics

Target=Churn Target Label=' '

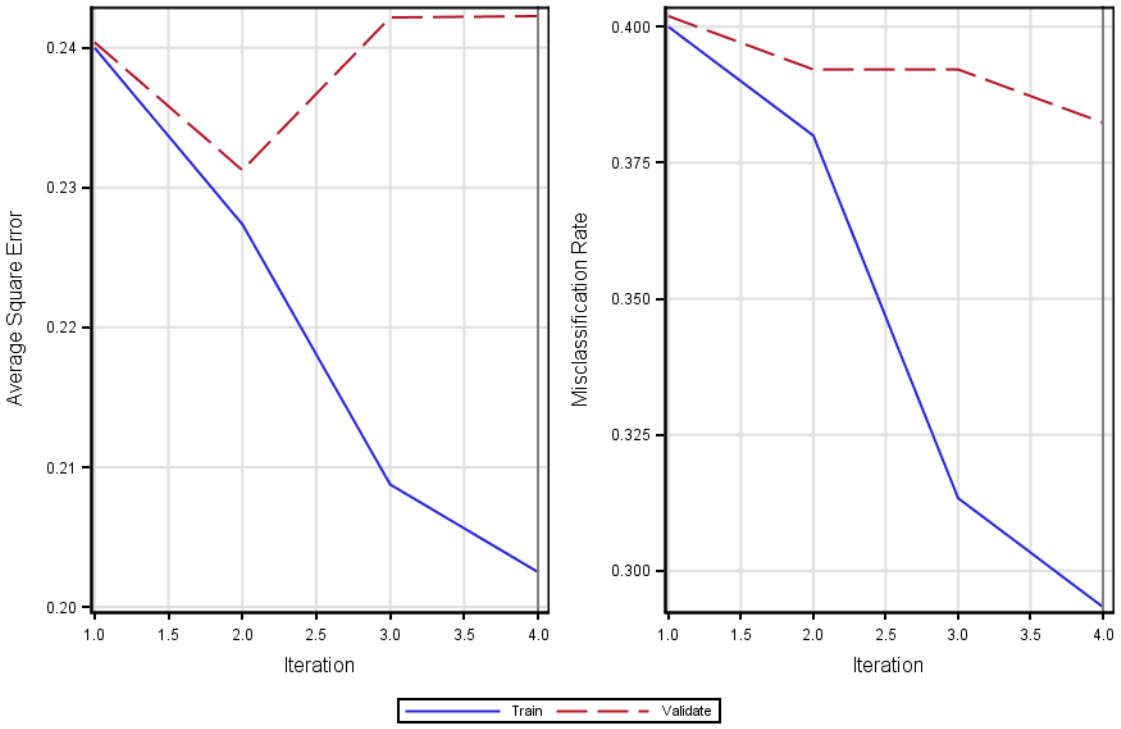
Label of Statistic	Train	Validation	Test
Sum of Frequencies	150.000	102.000	.
Misclassification Rate	0.293	0.382	.
Maximum Absolute Error	0.917	0.917	.
Sum of Squared Errors	60.750	49.422	.
Average Squared Error	0.202	0.242	.
Root Average Squared Error	0.450	0.492	.
Divisor for ASE	300.000	204.000	.
Total Degrees of Freedom	150.000	.	.

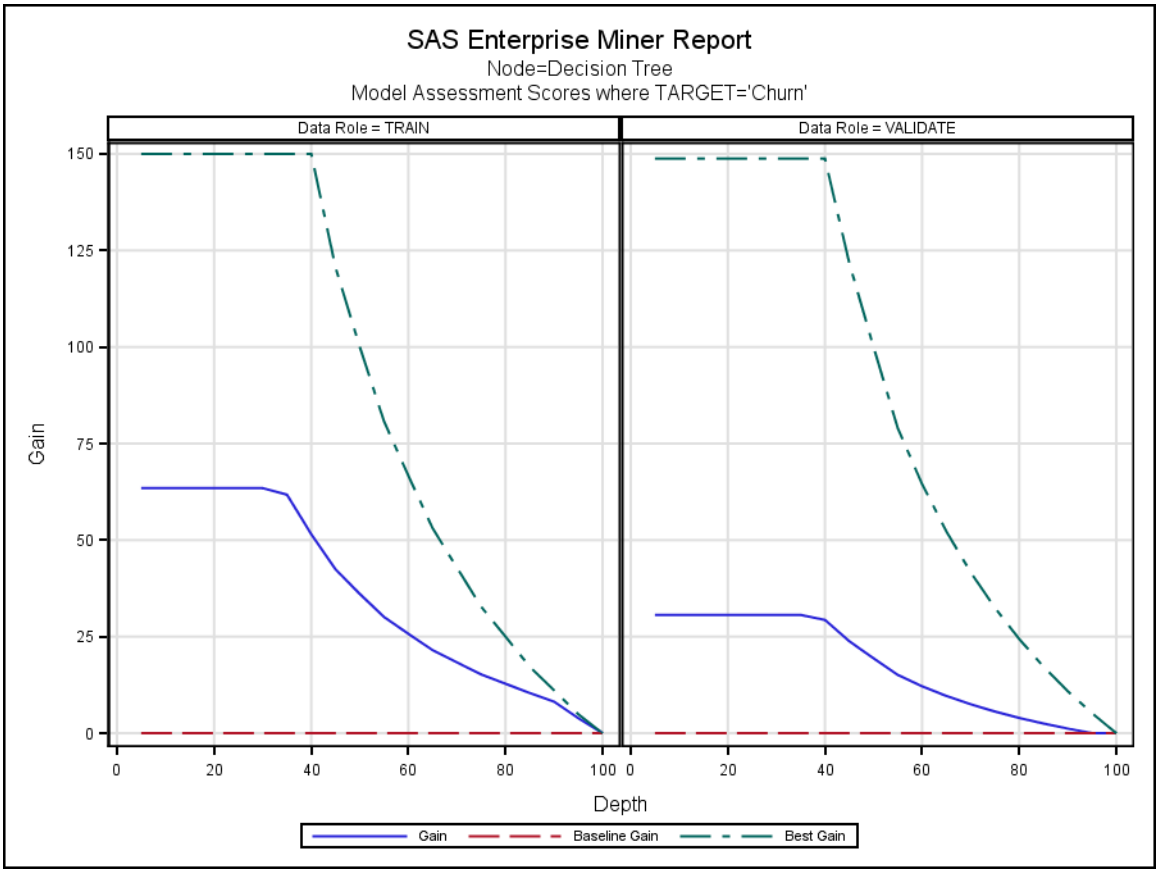


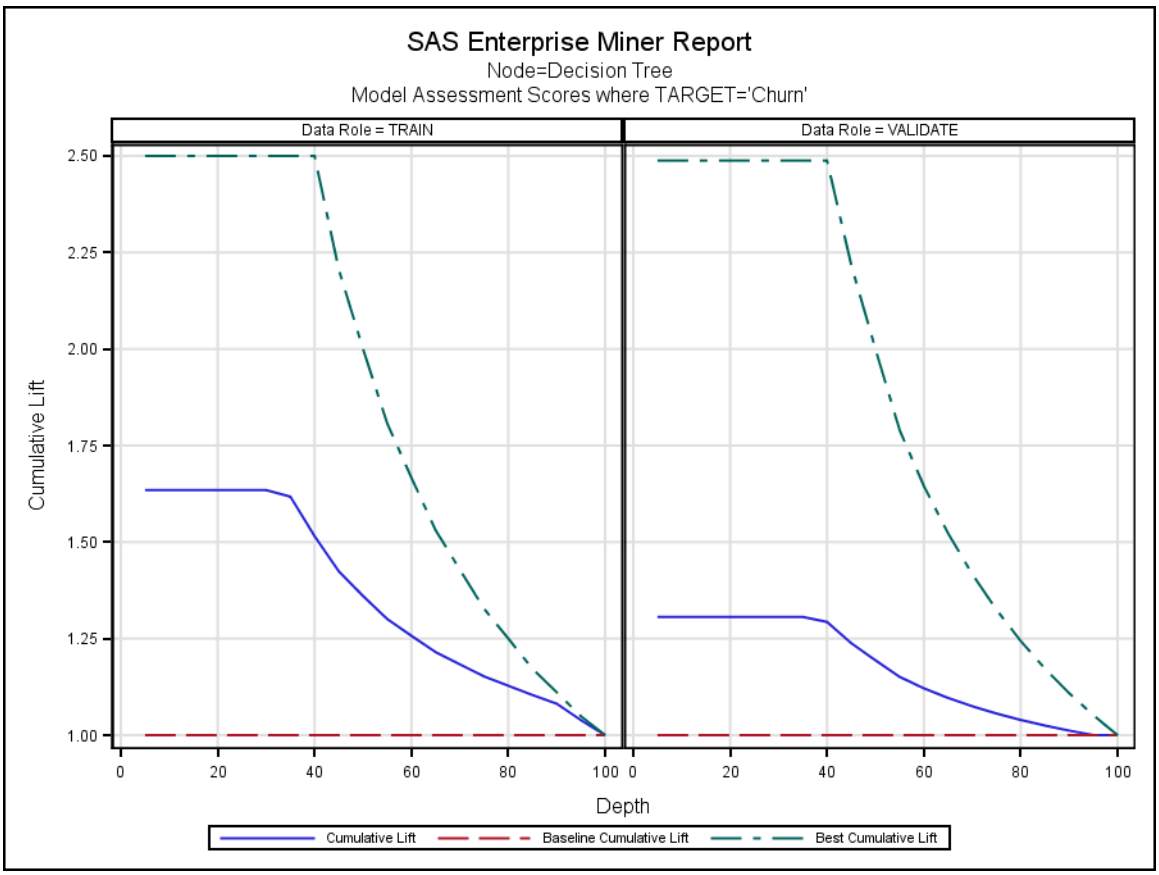
SAS Enterprise Miner Report
Node=Decision Tree
Treemap

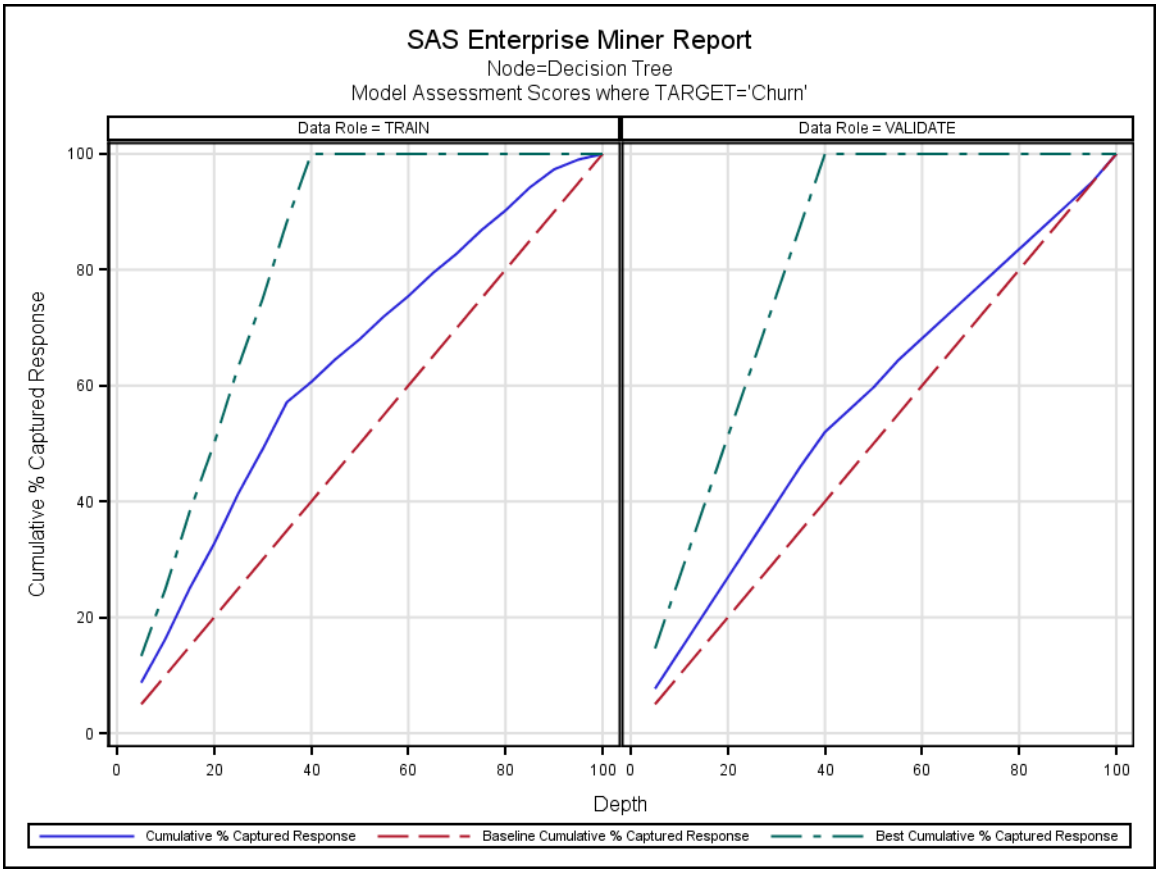


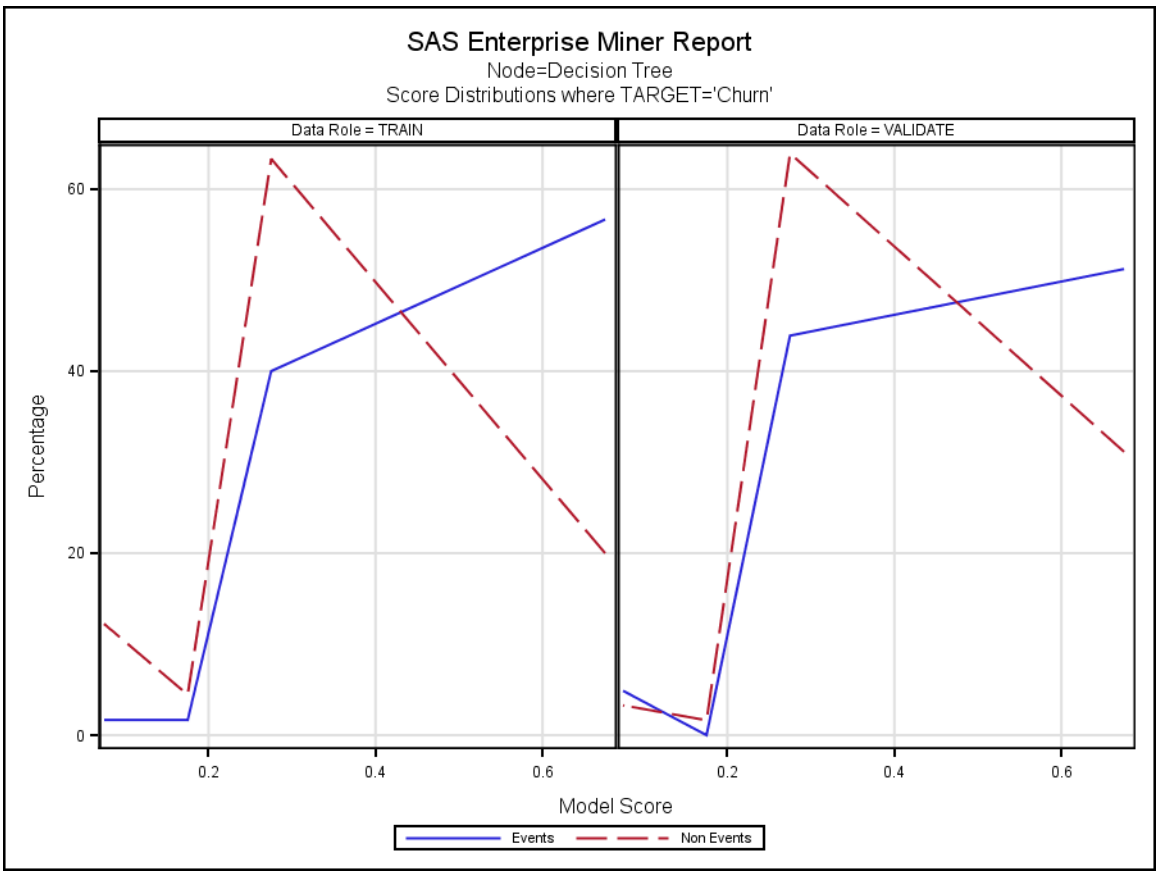
SAS Enterprise Miner Report
Node=Decision Tree
Model Iteration Plots

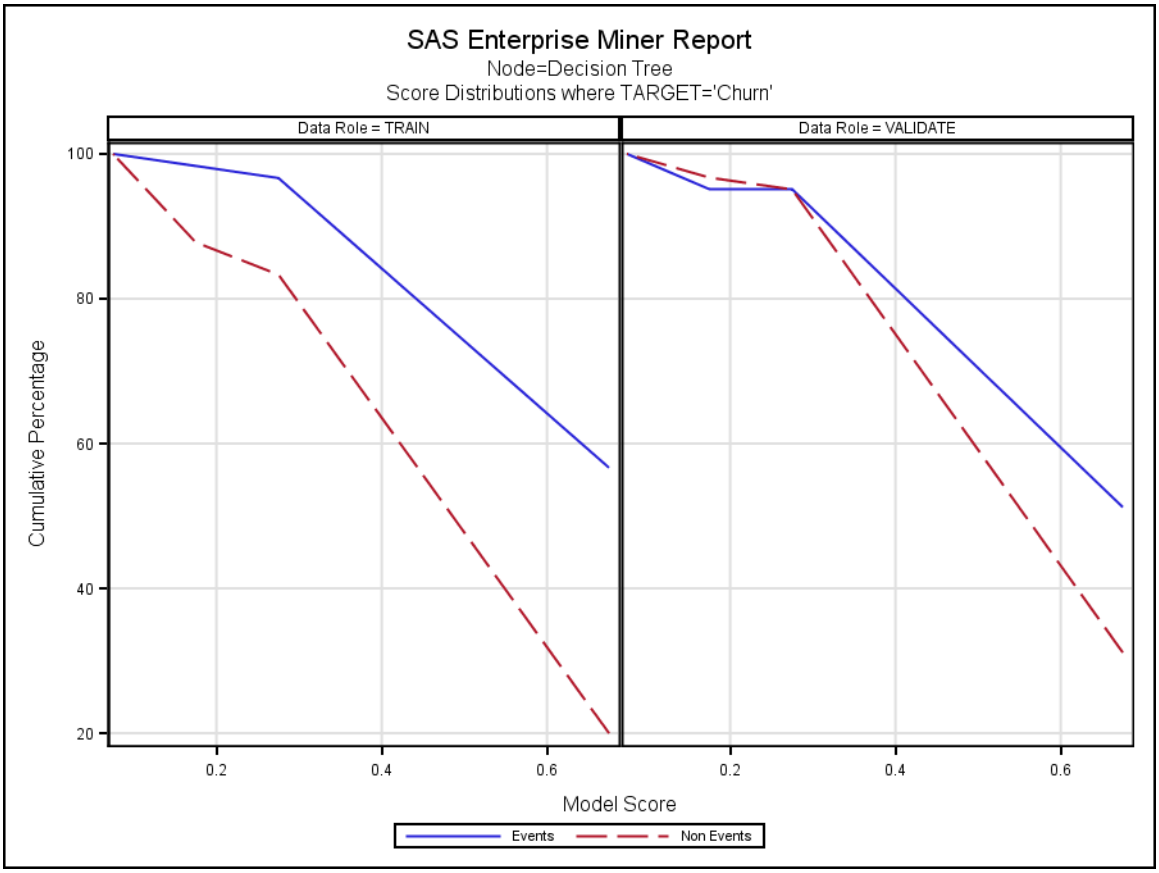



SAS Enterprise Miner Report
Node=Decision Tree
Model Assessment Scores where TARGET='Churn'
Data Role = TRAIN
Data Role = VALIDATE
Gain
150
125
100
75
50
25
0
0
20
40
60
80
100
Depth
Gain
Baseline Gain
Best Gain


SAS Enterprise Miner Report
Node=Decision Tree
Model Assessment Scores where TARGET='Churn'
Data Role = TRAIN
Data Role = VALIDATE
Cumulative Lift
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0
20
40
60
80
100
Depth
Cumulative Lift
Baseline Cumulative Lift
Best Cumulative Lift


SAS Enterprise Miner Report
Node=Decision Tree
Model Assessment Scores where TARGET='Churn'
Data Role = TRAIN
Data Role = VALIDATE
Cumulative % Captured Response
Depth
Cumulative % Captured Response
Baseline Cumulative % Captured Response
Best Cumulative % Captured Response


SAS Enterprise Miner Report
Node=Decision Tree
Score Distributions where TARGET='Churn'
Data Role = TRAIN
Data Role = VALIDATE
Percentage
Model Score
Events
Non Events



Node=Decision Tree
Score Distributions

Target Variable=Churn Data Role=TRAIN

Posterior Probability Range	Number of Events	Percentage of Events	Percentage of Nonevents	Cumulative Percentage of Events	Cumulative Percentage of Nonevents
0.65-0.70	34	56.6667	20.0000	56.667	20.000
0.25-0.30	24	40.0000	63.3333	96.667	83.333
0.15-0.20	1	1.6667	4.4444	98.333	87.778
0.05-0.10	1	1.6667	12.2222	100.000	100.000

Target Variable=Churn Data Role=VALIDATE

Posterior Probability Range	Number of Events	Percentage of Events	Percentage of Nonevents	Cumulative Percentage of Events	Cumulative Percentage of Nonevents
0.65-0.70	21	51.2195	31.1475	51.220	31.148
0.25-0.30	18	43.9024	63.9344	95.122	95.082
0.15-0.20	0	0.0000	1.6393	95.122	96.721
0.05-0.10	2	4.8780	3.2787	100.000	100.000

SAS Enterprise Miner Report

Node=Gradient Boosting
Summary

Node id = Boost
Node label = Gradient Boosting
Meta path = FIMPORT => 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	0.1		ObsImportance	N		VarSelection	Y	

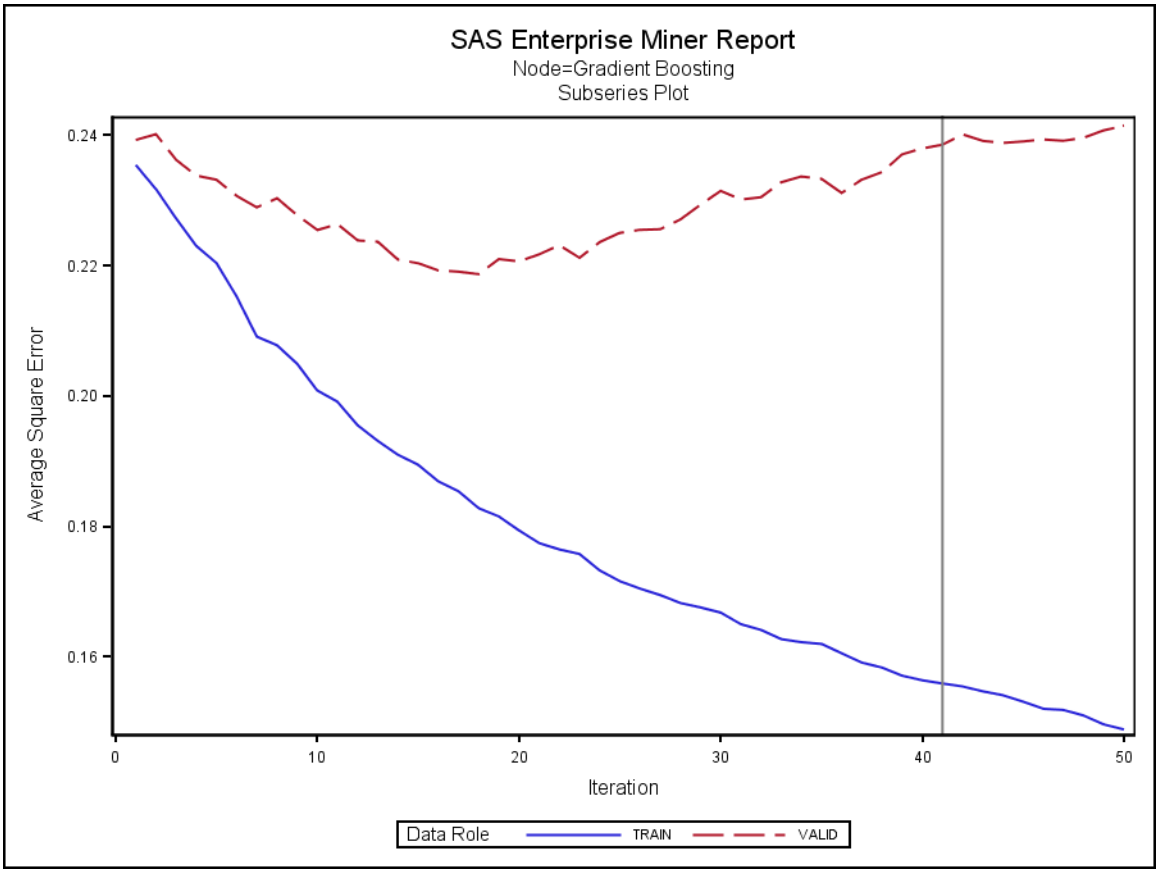
Node=Gradient Boosting
Variable Summary

Role	Level	Frequency Count	Name
TARGET	NOMINAL	1	Churn
INPUT	NOMINAL	10	Age CustomerConsumptionLevel FinancialStatus Gender Location MaritalStatus ProductCategoryPerferred ProductSelectionTime PurchaseFrequency TotalSpend
ID	INTERVAL	1	_dataobs_
ID	NOMINAL	1	CustomerID

Node=Gradient Boosting
Model Fit Statistics

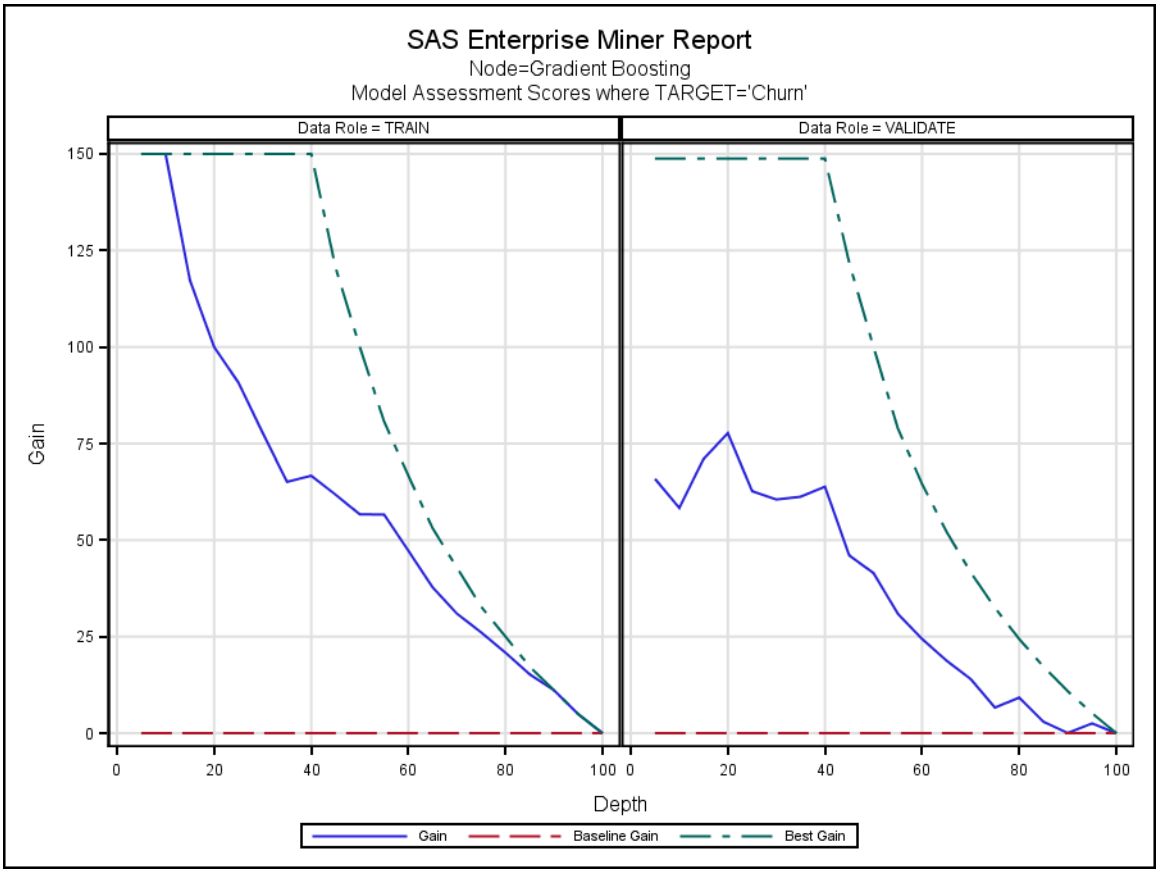
Target=Churn Target Label=' '

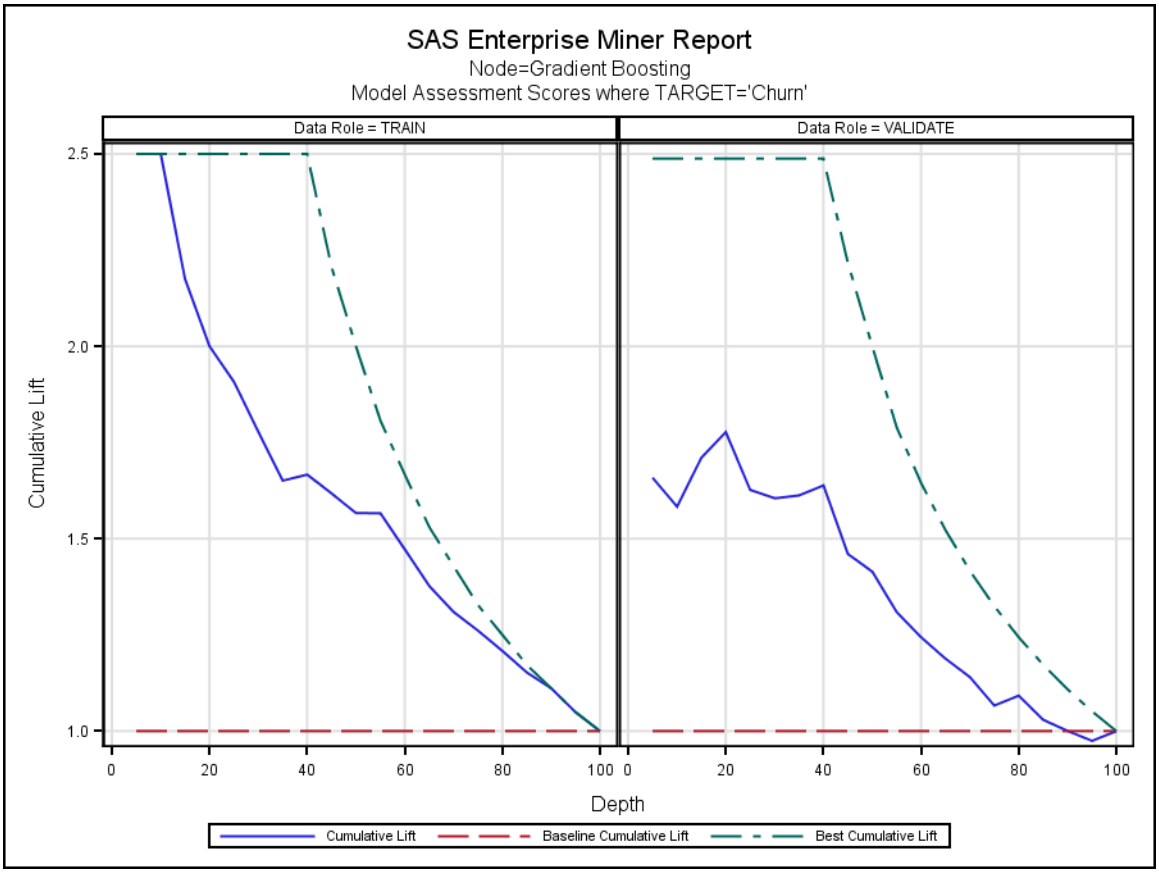
Label of Statistic	Train	Validation	Test
Sum of Frequencies	150.000	102.000	.
Sum of Case Weights Times Freq	300.000	204.000	.
Misclassification Rate	0.267	0.304	.
Maximum Absolute Error	0.735	0.821	.
Sum of Squared Errors	56.830	44.954	.
Average Squared Error	0.189	0.220	.
Root Average Squared Error	0.435	0.469	.
Divisor for ASE	300.000	204.000	.
Total Degrees of Freedom	150.000	.	.

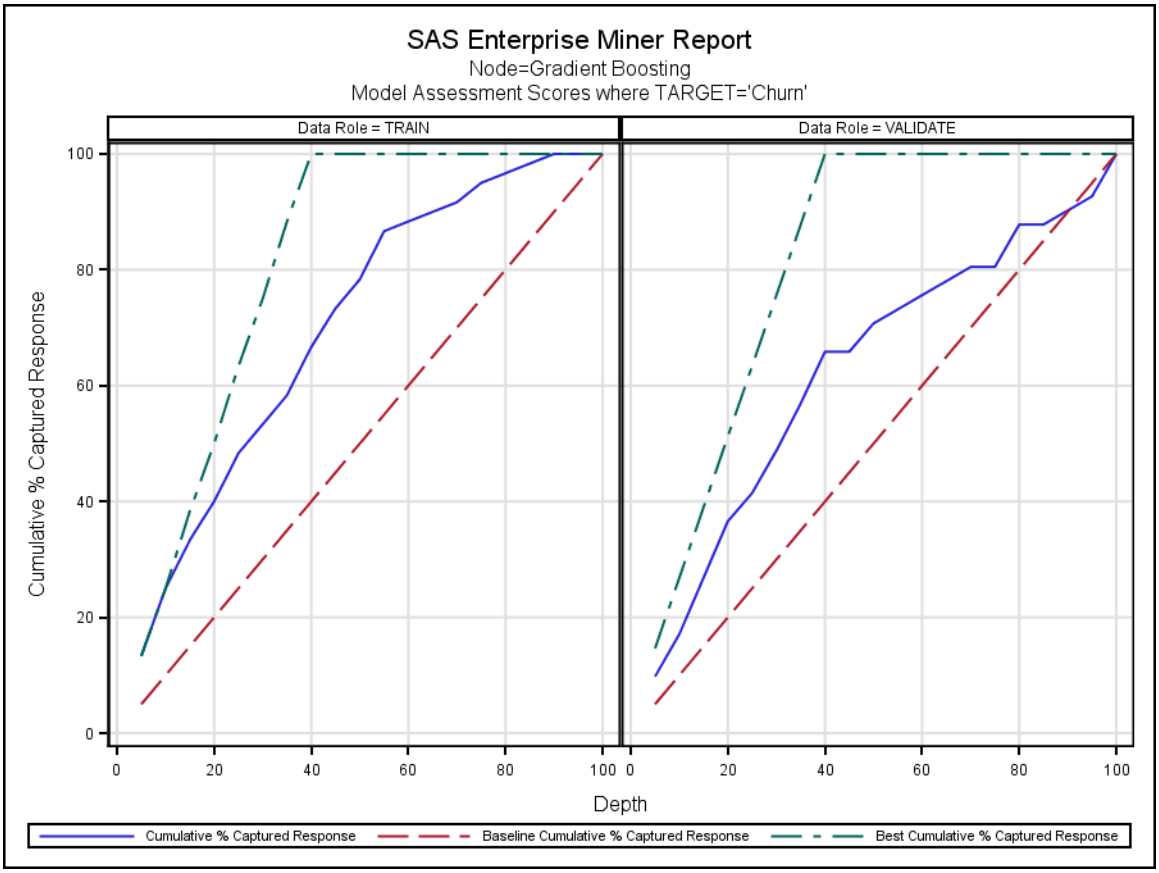


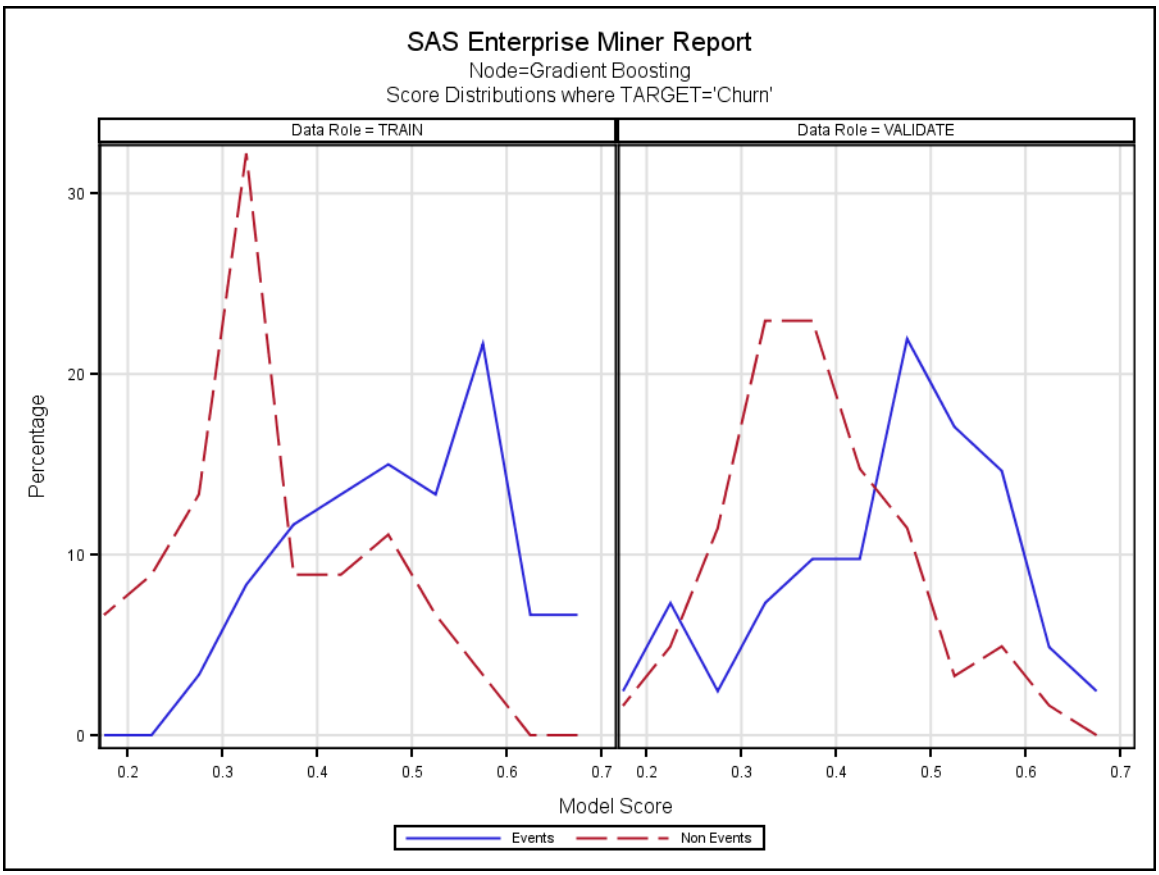
Node=Gradient Boosting
Variable Importance

Variable Name	Label	Number of Splitting Rules	Importance	Validation Importance	Ratio of Validation to Training Importance
Age		7	1.00000	0.40767	0.40767
ProductSelectionTime		8	0.92185	0.00000	0.00000
FinancialStatus		5	0.78546	1.00000	1.27314
PurchaseFrequency		4	0.63873	0.00000	0.00000
ProductCategoryPerferred		4	0.63484	0.44517	0.70123
Location		4	0.60140	0.31928	0.53090
TotalSpend		1	0.28428	0.00000	0.00000
CustomerConsumptionLevel		1	0.22103	0.00000	0.00000
MaritalStatus		1	0.19633	0.00000	0.00000
Gender		0	0.00000	0.00000	.

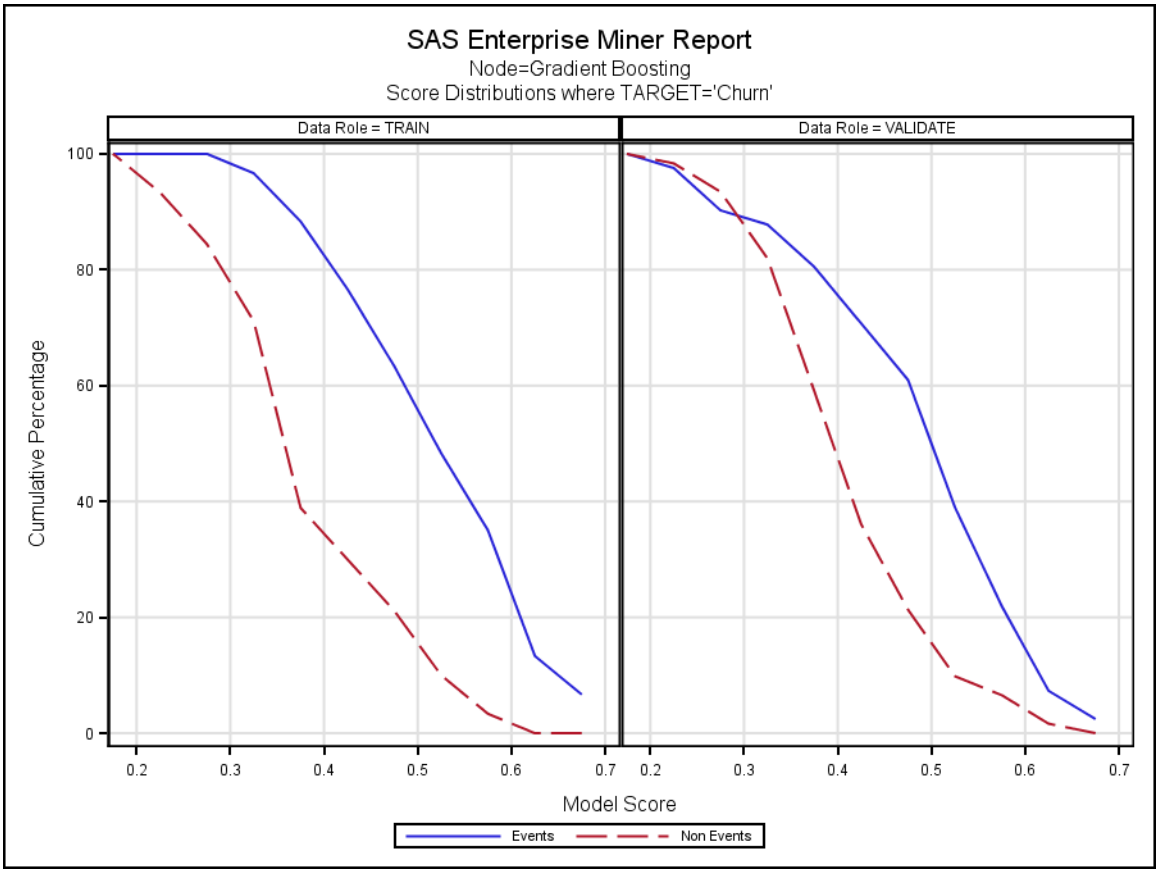

SAS Enterprise Miner Report
Node=Gradient Boosting
Model Assessment Scores where TARGET='Churn'
Data Role = TRAIN
Data Role = VALIDATE
Gain
150
125
100
75
50
25
0
0
20
40
60
80
100
Depth
Gain
Baseline Gain
Best Gain


SAS Enterprise Miner Report
Node=Gradient Boosting
Model Assessment Scores where TARGET='Churn'
Data Role = TRAIN
Data Role = VALIDATE
Cumulative Lift
2.5
2.0
1.5
1.0
0
20
40
60
80
100
Depth
Cumulative Lift
Baseline Cumulative Lift
Best Cumulative Lift


SAS Enterprise Miner Report
Node=Gradient Boosting
Model Assessment Scores where TARGET='Churn'
Data Role = TRAIN
Data Role = VALIDATE
Cumulative % Captured Response
Depth
Cumulative % Captured Response
Baseline Cumulative % Captured Response
Best Cumulative % Captured Response


SAS Enterprise Miner Report
Node=Gradient Boosting
Score Distributions where TARGET='Churn'
Data Role = TRAIN
Data Role = VALIDATE
Percentage
Model Score
Events
Non Events

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



Node=Gradient Boosting
Score Distributions

Target Variable=Churn Data Role=TRAIN

Posterior Probability Range	Number of Events	Percentage of Events	Percentage of Nonevents	Cumulative Percentage of Events	Cumulative Percentage of Nonevents
0.65-0.70	4	6.6667	0.0000	6.667	0.000
0.60-0.65	4	6.6667	0.0000	13.333	0.000
0.55-0.60	13	21.6667	3.3333	35.000	3.333
0.50-0.55	8	13.3333	6.6667	48.333	10.000
0.45-0.50	9	15.0000	11.1111	63.333	21.111
0.40-0.45	8	13.3333	8.8889	76.667	30.000
0.35-0.40	7	11.6667	8.8889	88.333	38.889
0.30-0.35	5	8.3333	32.2222	96.667	71.111
0.25-0.30	2	3.3333	13.3333	100.000	84.444
0.20-0.25	0	0.0000	8.8889	100.000	93.333
0.15-0.20	0	0.0000	6.6667	100.000	100.000

Target Variable=Churn Data Role=VALIDATE

Posterior Probability Range	Number of Events	Percentage of Events	Percentage of Nonevents	Cumulative Percentage of Events	Cumulative Percentage of Nonevents
0.65-0.70	1	2.4390	0.0000	2.439	0.000
0.60-0.65	2	4.8780	1.6393	7.317	1.639
0.55-0.60	6	14.6341	4.9180	21.951	6.557
0.50-0.55	7	17.0732	3.2787	39.024	9.836

Target Variable=Churn Data Role=VALIDATE

Posterior Probability Range	Number of Events	Percentage of Events	Percentage of Nonevents	Cumulative Percentage of Events	Cumulative Percentage of Nonevents
0.45-0.50	9	21.9512	11.4754	60.976	21.311
0.40-0.45	4	9.7561	14.7541	70.732	36.066
0.35-0.40	4	9.7561	22.9508	80.488	59.016
0.30-0.35	3	7.3171	22.9508	87.805	81.967
0.25-0.30	1	2.4390	11.4754	90.244	93.443
0.20-0.25	3	7.3171	4.9180	97.561	98.361
0.15-0.20	1	2.4390	1.6393	100.000	100.000

SAS Enterprise Miner Report

Node=Ensemble
Summary

Node id = Ensmbl
Node label = Ensemble
Meta path = FIMPORT => Part => Tree => Ensmbl
Notes =

Node=Ensemble
Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	Ensemble		Posterior	AVERAGE		Predicted	AVERAGE	

Node=Ensemble
Variable Summary

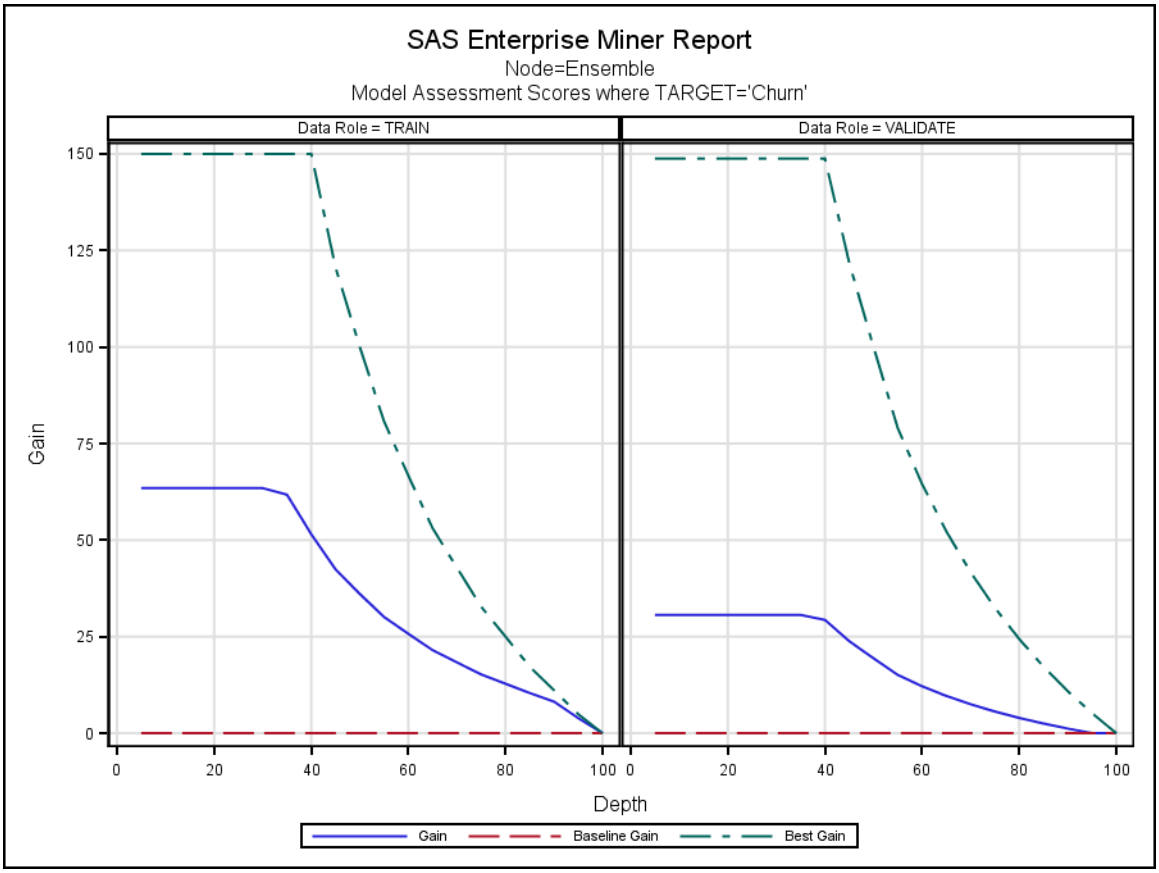
Role	Level	Frequency Count	Name
TARGET	NOMINAL	1	Churn
INPUT	NOMINAL	3	Age FinancialStatus TotalSpend

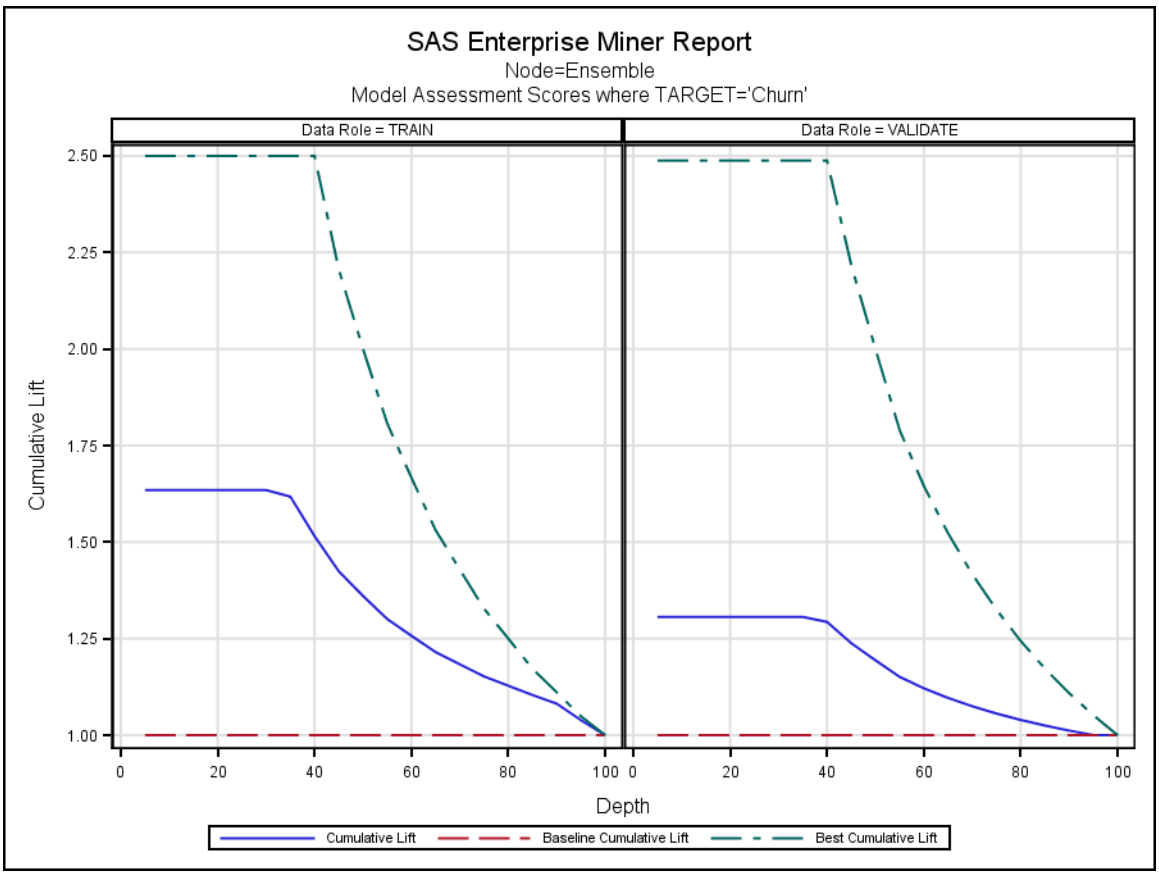
Node=Ensemble
Model Fit Statistics

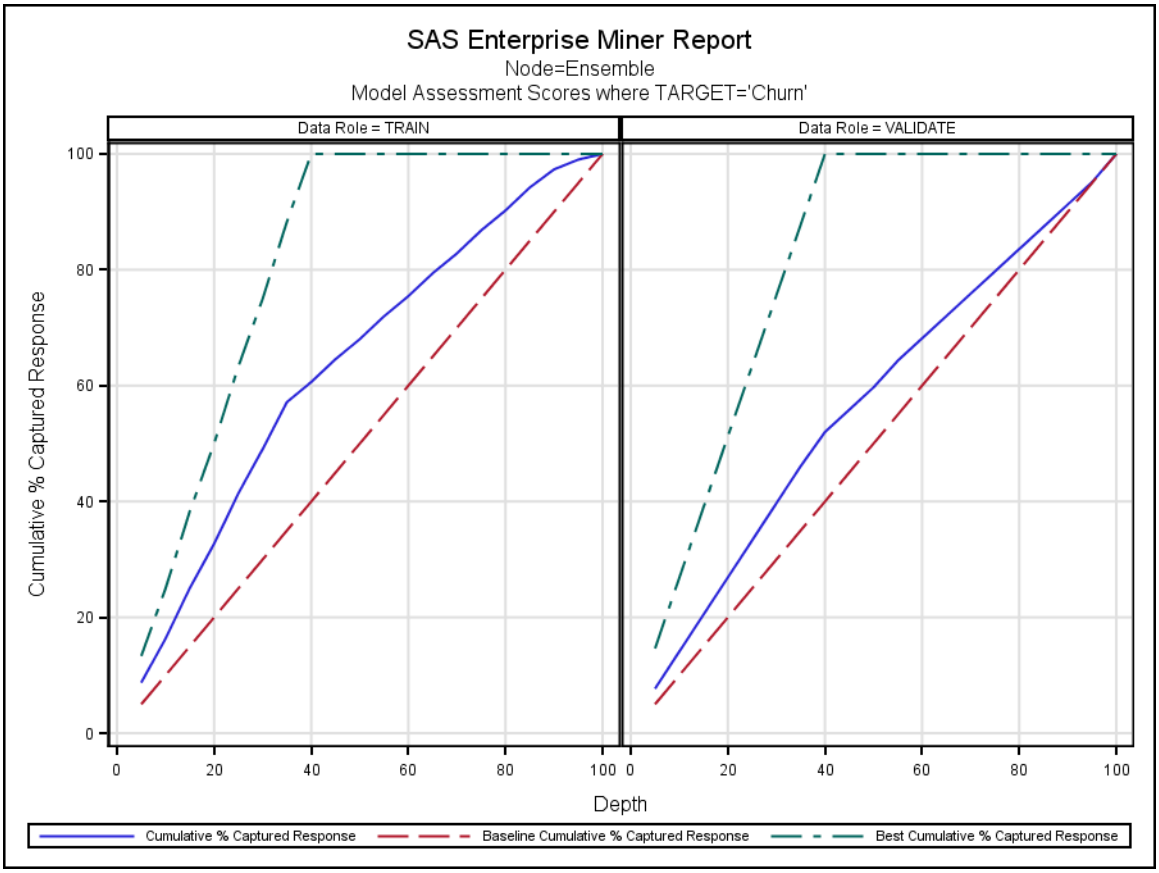
Target=Churn Target Label=' '

Label of Statistic	Train	Validation	Test
Average Squared Error	0.202	0.242	.
Divisor for ASE	300.000	204.000	.
Maximum Absolute Error	0.917	0.917	.
Sum of Frequencies	150.000	102.000	.
Root Average Squared Error	0.450	0.492	.
Sum of Squared Errors	60.750	49.422	.
Frequency of Classified Cases	150.000	102.000	.
Misclassification Rate	0.293	0.382	.
Number of Wrong Classifications	44.000	39.000	.

SAS Enterprise Miner Report
Node=Ensemble
Model Assessment Scores where TARGET='Churn'

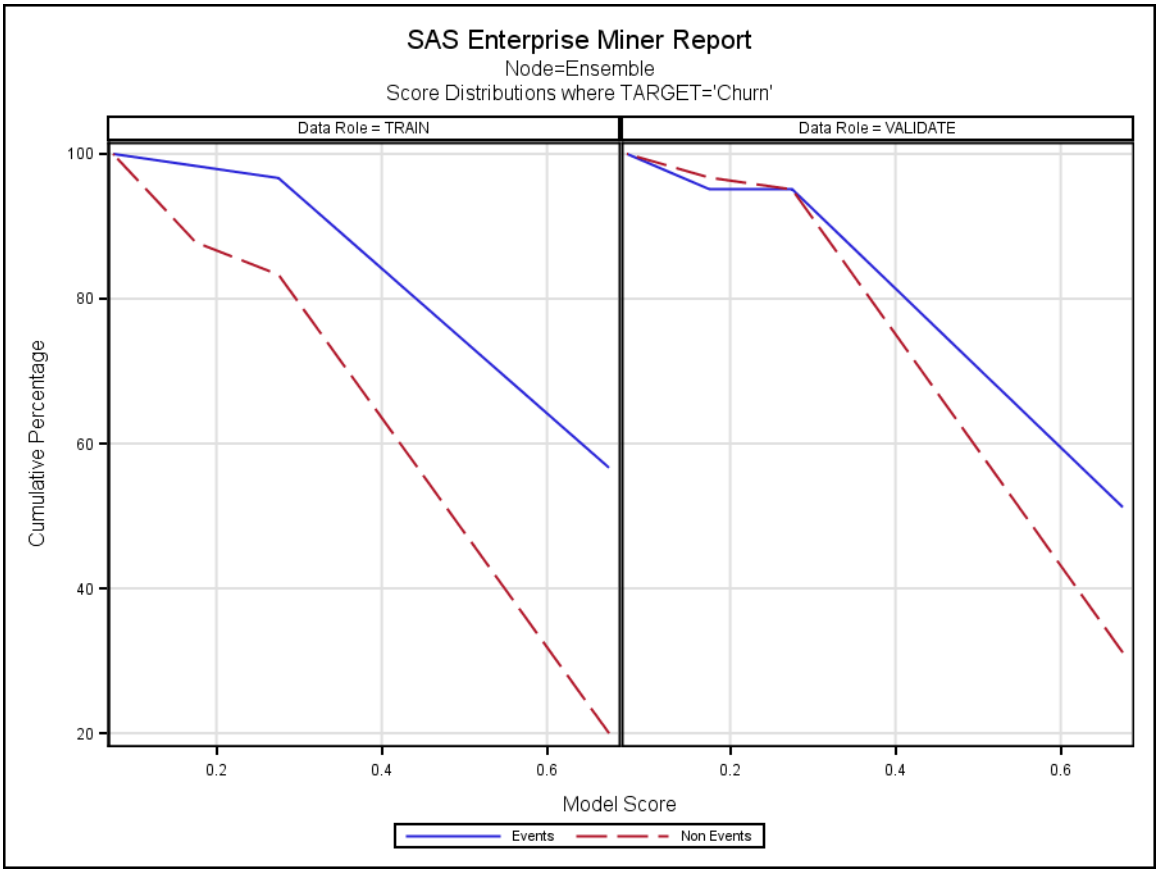





SAS Enterprise Miner Report
Node=Ensemble
Model Assessment Scores where TARGET='Churn'
Data Role = TRAIN
Data Role = VALIDATE
Cumulative % Captured Response
Depth
Cumulative % Captured Response
Baseline Cumulative % Captured Response
Best Cumulative % Captured Response


SAS Enterprise Miner Report
Node=Ensemble
Score Distributions where TARGET='Churn'
Data Role = TRAIN
Data Role = VALIDATE
Percentage
Model Score
Events
Non Events

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



Node=Ensemble
Score Distributions

Target Variable=Churn Data Role=TRAIN

Posterior Probability Range	Number of Events	Percentage of Events	Percentage of Nonevents	Cumulative Percentage of Events	Cumulative Percentage of Nonevents
0.65-0.70	34	56.6667	20.0000	56.667	20.000
0.25-0.30	24	40.0000	63.3333	96.667	83.333
0.15-0.20	1	1.6667	4.4444	98.333	87.778
0.05-0.10	1	1.6667	12.2222	100.000	100.000

Target Variable=Churn Data Role=VALIDATE

Posterior Probability Range	Number of Events	Percentage of Events	Percentage of Nonevents	Cumulative Percentage of Events	Cumulative Percentage of Nonevents
0.65-0.70	21	51.2195	31.1475	51.220	31.148
0.25-0.30	18	43.9024	63.9344	95.122	95.082
0.15-0.20	0	0.0000	1.6393	95.122	96.721
0.05-0.10	2	4.8780	3.2787	100.000	100.000

End of Report