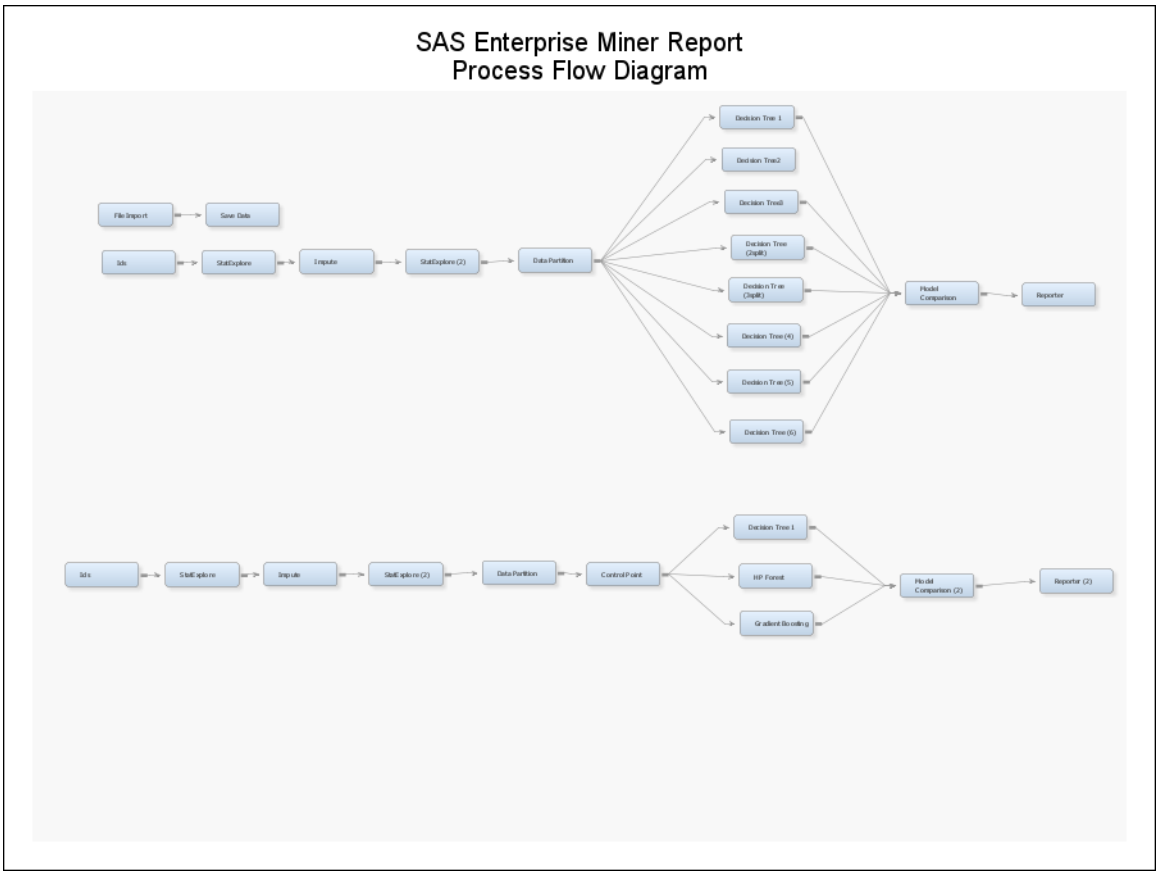
SAS Enterprise Miner Report

User = u63466161
Date = 07:15:08 08 January 2024
Project = AA1
Diagram = AA1

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

Format = PDF
Style = LISTING



SAS Enterprise Miner Report

Node=Ids
Summary

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

Node=Ids
Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	DataSource		DsCreatedBy	u63466161		NBytes	394240	.
ApplyIntervalLevelLowerLimit	Y		DsId	emsavetrain		NCols	11	.
ApplyMaxClassLevels	Y		DsModifiedBy	u63466161		NObs	2989	.
ApplyMaxPercentMissing	Y		DsModifyDate	2020186688.9		NewTable		
CMeta	WORK.M24S0NS3		DsSampleName			NewVariableRole	REJECT	
ComputeStatistics	N		DsSampleSize			OutputType	VIEW	
DBPassThrough	Y		DsSampleSizeType			Role	RAW	TRAIN
Data	SEMMA.EM_SAVE_TRAIN		DsScope	LOCAL		Sample	D	
DataSelection	DATASOURCE		IdentifyEmptyColumns	Y		SampleSizeObs	10000	
DataSource	emsavetrain		IntervalLowerLimit	20		SampleSizePercent	20	
DataSourceRole	RAW		Library	SEMMA		SampleSizeType	PERCENT	
Description			MaxClassLevels	20		Scope	LOCAL	
DropMapVariables	Y		MaxPercentMissing	50		Segment		
DsCreateDate	2020186688.9		MetaAdvisor	BASIC		Table	EM_SAVE_TRAIN	

Node=Ids
Data Attributes

Attribute	Value	Attribute	Value	Attribute	Value
Data Name	EM_SAVE_TRAIN	Date Created	06 January 2024 18:41:15	Data Size	394240
Data Type	DATA	Date Modified	06 January 2024 18:41:15	Role	RAW
Data Label		Number Rows	2989	Segment	
Engine	V9	Number Columns	11	Data Library	SEMMA

Node=Ids
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.	
Gender		INPUT	NOMINAL	C	6	$6.	
LastPurchaseDate		INPUT	INTERVAL	N	8	YYMMDD10.0	
Location		INPUT	NOMINAL	C	13	$13.	
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=StatExplore
Summary

Node id = Stat
Node label = StatExplore
Meta path = Ids => Stat
Notes =

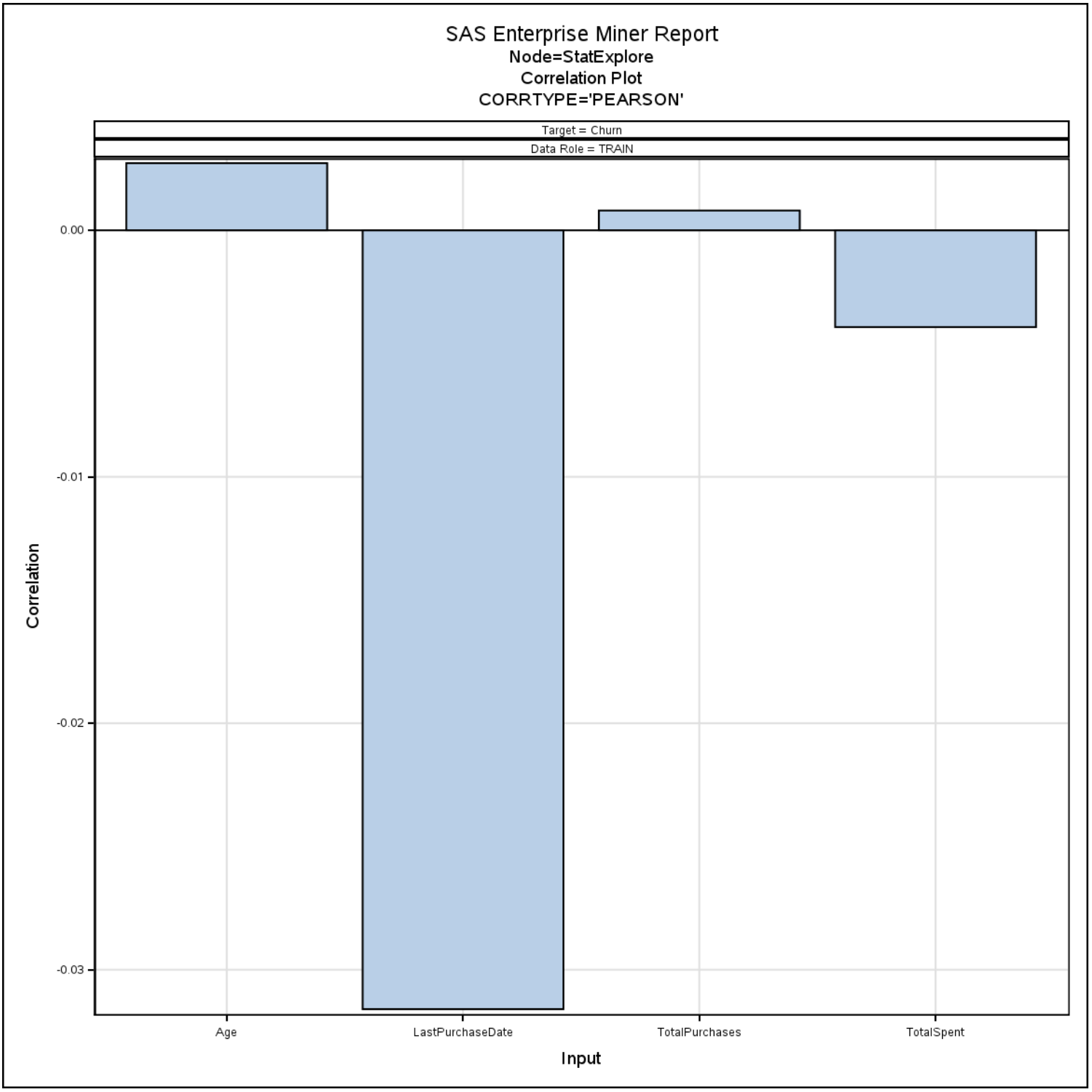
Node=StatExplore
Properties

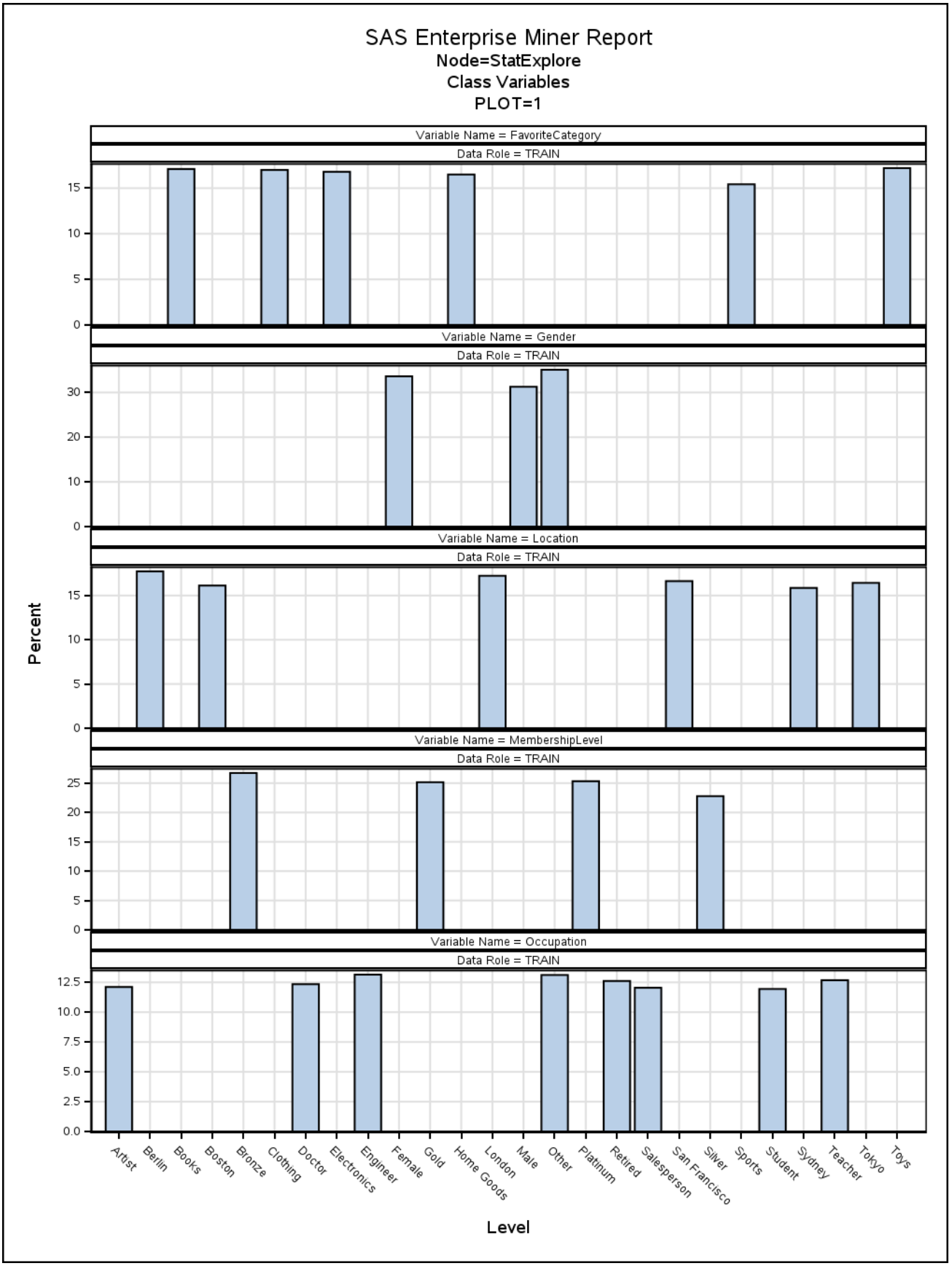
Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	StatExplore		Correlation	Y		NObs	100000	1000000
BySegment	N	Y	DropRejected	Y		Pearson	Y	
ChiSquare	Y		HideVariable	Y		Spearman	N	
ChiSquareInterval	Y	N	IntervalDistribution	Y		UseScore	N	
ChiSquareIntervalNBins	5		LevelSummary	Y		UseTest	N	
ClassDistribution	Y		MaximumVars	1000		UseValidate	N	

Node=StatExplore
Variable Summary

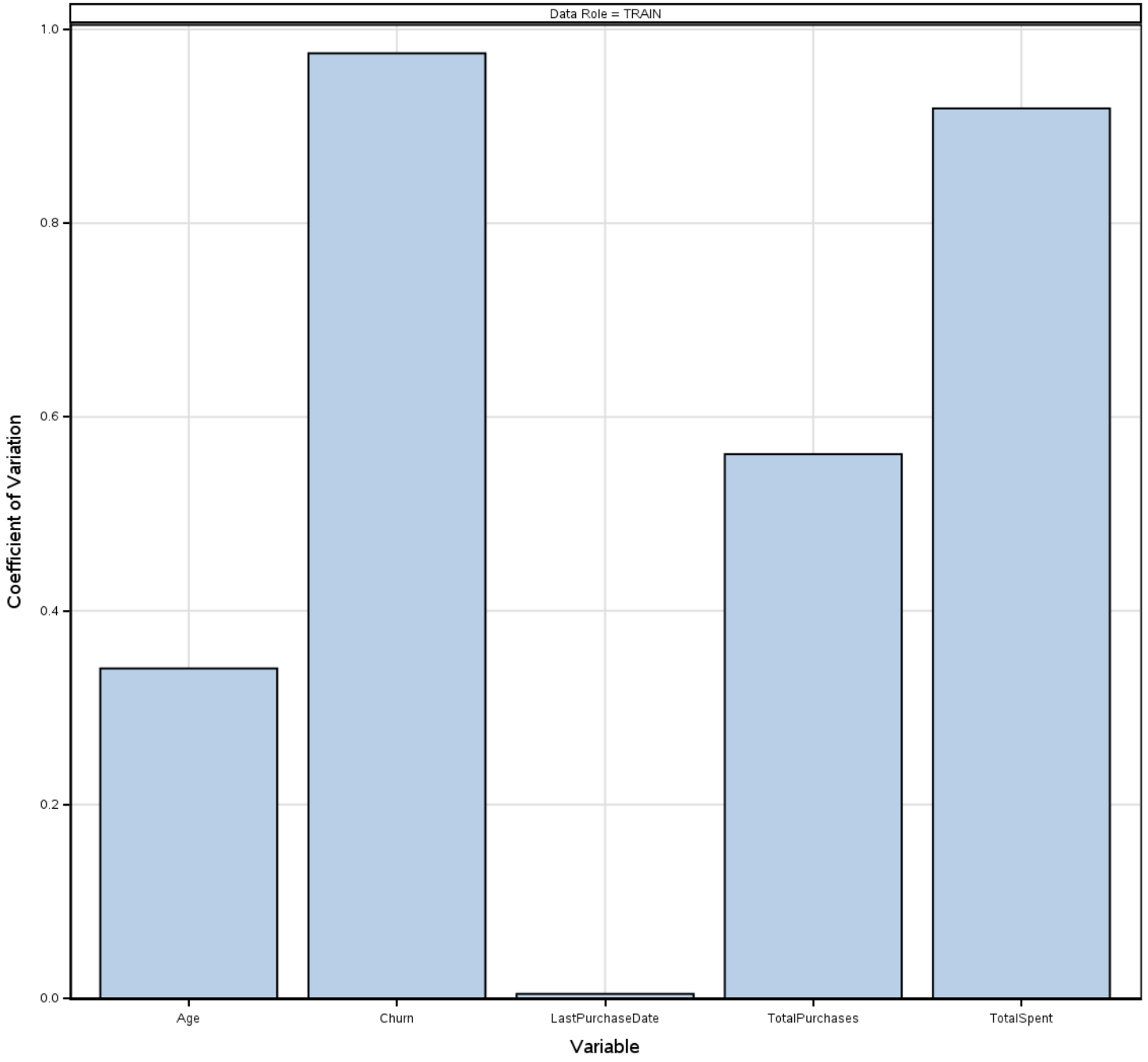
Role	Level	Frequency Count	Name
INPUT	INTERVAL	4	Age LastPurchaseDate TotalPurchases TotalSpent
INPUT	NOMINAL	5	FavoriteCategory Gender Location MembershipLevel Occupation

Target	Variable	Importance	Worth	Analysis Variable	Label	plot
Churn	TotalSpent	1	.001732582	1	TotalSpent	.
Churn	LastPurchaseDate	2	.001642663	1	LastPurchaseDate	.
Churn	TotalPurchases	3	.001524903	1	TotalPurchases	.
Churn	Age	4	.001379986	1	Age	.
Churn	FavoriteCategory	5	.000723734	1	FavoriteCategory	.
Churn	Location	6	.000432581	1	Location	.
Churn	Gender	7	.000364081	1	Gender	.
Churn	MembershipLevel	8	.000196550	1	MembershipLevel	.
Churn	Occupation	9	.000160322	1	Occupation	.


SAS Enterprise Miner Report
Node=StatExplore
Correlation Plot
CORRTYPE='PEARSON'
Target = Churn
Data Role = TRAIN
0.00
-0.01
-0.02
-0.03
Correlation
Age
LastPurchaseDate
TotalPurchases
TotalSpent
Input


SAS Enterprise Miner Report
Node=StatExplore
Class Variables
PLOT=1
Variable Name = FavoriteCategory
Data Role = TRAIN
Variable Name = Gender
Data Role = TRAIN
Variable Name = Location
Data Role = TRAIN
Variable Name = MembershipLevel
Data Role = TRAIN
Variable Name = Occupation
Data Role = TRAIN
Percent
Level
Artist
Berlin
Books
Boston
Bronze
Clothing
Doctor
Electronics
Engineer
Female
Gold
Home Goods
London
Male
Other
Platinum
Retired
Salesperson
San Francisco
Silver
Sports
Student
Sydney
Teacher
Tokyo
Toys

SAS Enterprise Miner Report
Node=StatExplore
Interval Variables



SAS Enterprise Miner Report

Node=Impute
Summary

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

Node=Impute
Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	Impute		IndicatorRole	INPUT	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	UNIQUE	NONE	MethodTargetInterval	NONE				

Node=Impute
Variable Summary

Role	Level	Frequency Count	Name
INPUT	INTERVAL	4	Age LastPurchaseDate TotalPurchases TotalSpent
INPUT	NOMINAL	5	FavoriteCategory Gender Location MembershipLevel Occupation

Node=Impute
Imputation Summary

Variable Name	Impute Method	Imputed Variable	Indicator Variable	Impute Value	Role	Measurement Level	Label	Number of Missing for TRAIN
Age	MEAN	IMP_Age	M_Age	43.3811	INPUT	INTERVAL		8
TotalPurchases	MEAN	IMP_TotalPurchases	M_TotalPurchases	50.1017	INPUT	INTERVAL		9

SAS Enterprise Miner Report

Node=StatExplore (2)
Summary

Node id = Stat2
Node label = StatExplore (2)
Meta path = Ids => Stat => Impt => Stat2
Notes =

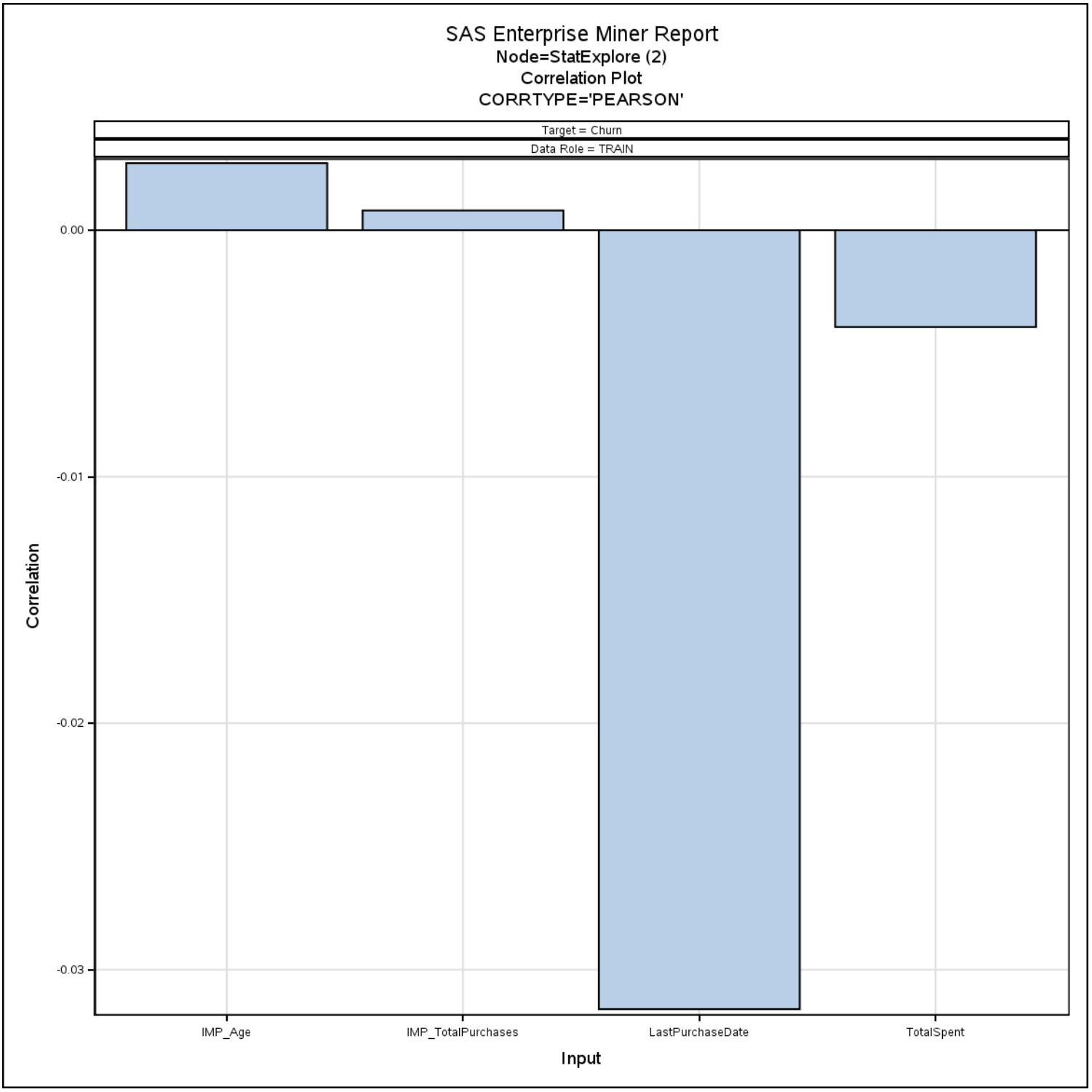
Node=StatExplore (2)
Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	StatExplore		Correlation	Y		NObs	100000	1000000
BySegment	N	Y	DropRejected	Y		Pearson	Y	
ChiSquare	Y		HideVariable	Y		Spearman	N	
ChiSquareInterval	N		IntervalDistribution	Y		UseScore	N	
ChiSquareIntervalNBins	5		LevelSummary	Y		UseTest	N	
ClassDistribution	Y		MaximumVars	1000		UseValidate	N	

Node=StatExplore (2)
Variable Summary

Role	Level	Frequency Count	Name
INPUT	BINARY	2	M_Age M_TotalPurchases
INPUT	INTERVAL	4	IMP_Age IMP_TotalPurchases LastPurchaseDate TotalSpent
INPUT	NOMINAL	5	FavoriteCategory Gender Location MembershipLevel Occupation

Target	Variable	Importance	Worth	Analysis Variable	Label	plot
Churn	TotalSpent	1	.001732582	1	TotalSpent	.
Churn	LastPurchaseDate	2	.001642663	1	LastPurchaseDate	.
Churn	IMP_TotalPurchases	3	.001513789	1	Imputed TotalPurchases	.
Churn	IMP_Age	4	.001255145	1	Imputed Age	.
Churn	FavoriteCategory	5	.000723734	1	FavoriteCategory	.
Churn	Location	6	.000432581	1	Location	.
Churn	Gender	7	.000364081	1	Gender	.
Churn	MembershipLevel	8	.000196550	1	MembershipLevel	.
Churn	M_Age	9	.000184986	1	Imputation Indicator for Age	.
Churn	Occupation	10	.000160322	1	Occupation	.
Churn	M_TotalPurchases	11	.000014007	1	Imputation Indicator for TotalPurchases	.

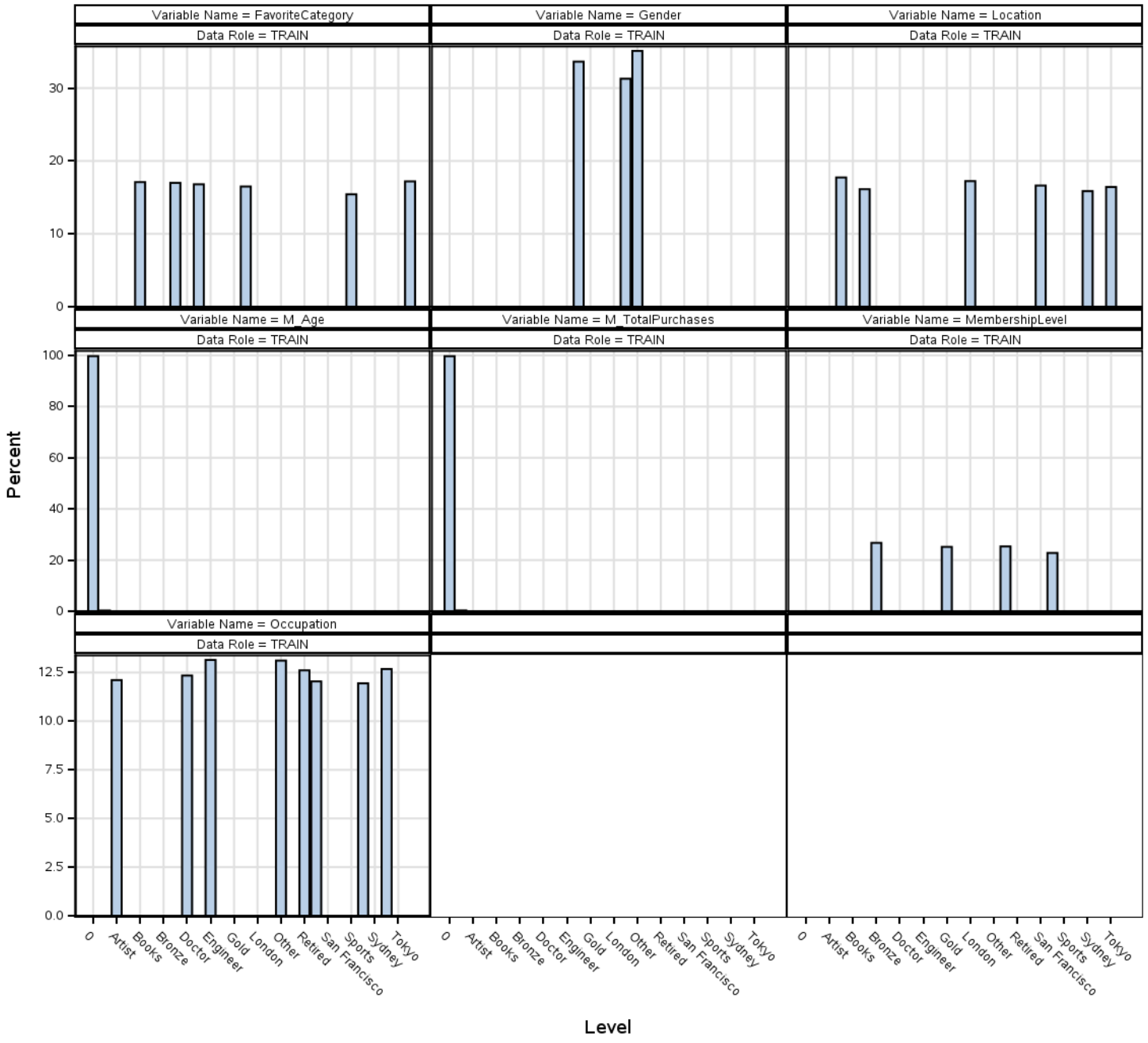

SAS Enterprise Miner Report
Node=StatExplore (2)
Correlation Plot
CORRTYPE='PEARSON'
Target = Churn
Data Role = TRAIN
0.00
-0.01
-0.02
-0.03
Correlation
IMP_Age
IMP_TotalPurchases
LastPurchaseDate
TotalSpent
Input

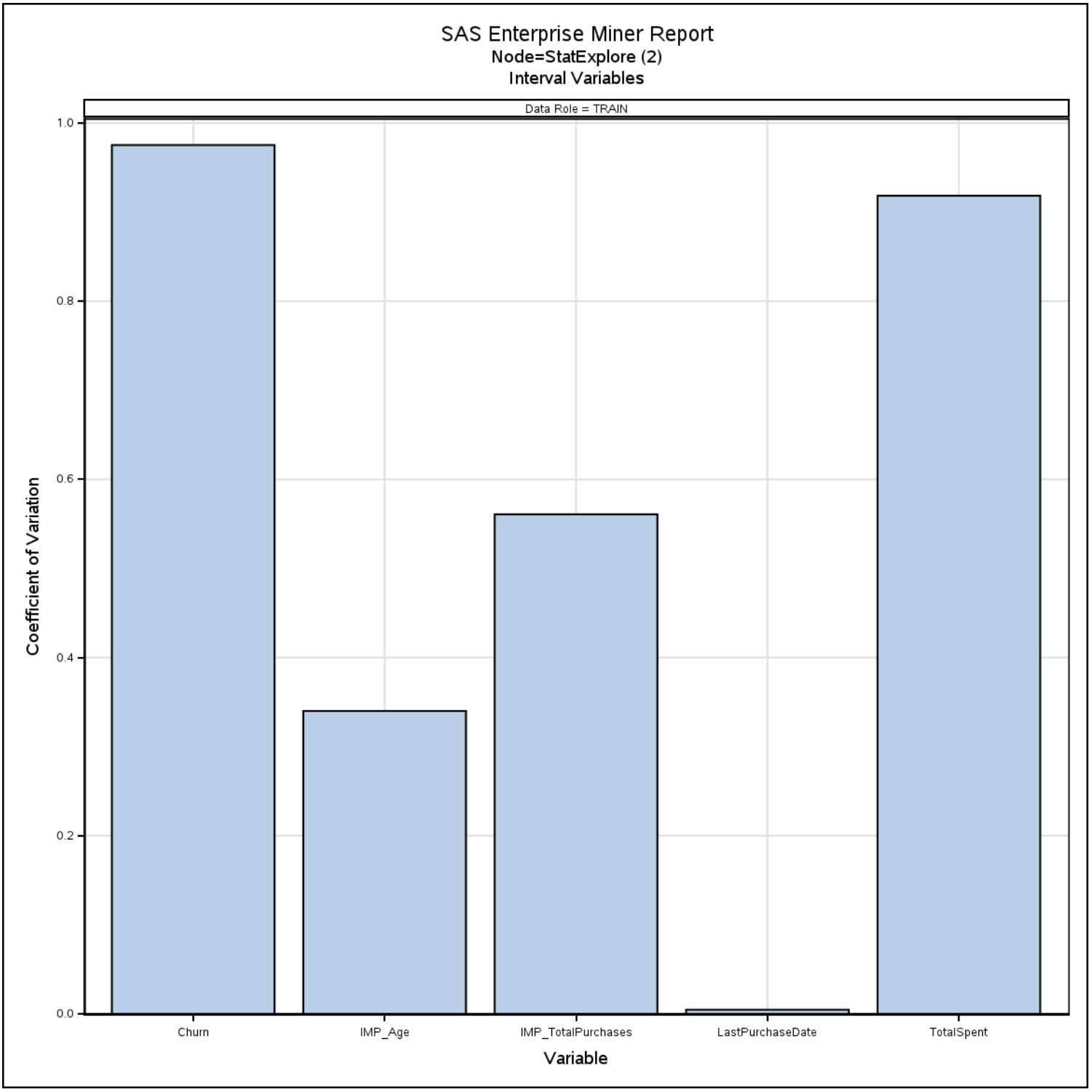
SAS Enterprise Miner Report

Node=StatExplore (2)

Class Variables

PLOT=1




SAS Enterprise Miner Report
Node=StatExplore (2)
Interval Variables
Data Role = TRAIN
Coefficient of Variation
1.0
0.8
0.6
0.4
0.2
0.0
Churn
IMP_Age
IMP_TotalPurchases
LastPurchaseDate
TotalSpent
Variable

SAS Enterprise Miner Report

Node=Data Partition
Summary

Node id = Part
Node label = Data Partition
Meta path = Ids => Stat => Impt => Stat2 => 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	BINARY	2	M_Age M_TotalPurchases
INPUT	INTERVAL	4	IMP_Age IMP_TotalPurchases LastPurchaseDate TotalSpent
INPUT	NOMINAL	5	FavoriteCategory Gender Location MembershipLevel Occupation
ID	INTERVAL	1	CustomerID

SAS Enterprise Miner Report

Node=Decision Tree3
Summary

Node id = Tree3
Node label = Decision Tree3
Meta path = Ids => Stat => Impt => Stat2 => Part => Tree3
Notes =

Node=Decision Tree3
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 Tree3
Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Churn
INPUT	BINARY	2	M_Age M_TotalPurchases
INPUT	INTERVAL	4	IMP_Age IMP_TotalPurchases LastPurchaseDate TotalSpent
INPUT	NOMINAL	5	FavoriteCategory Gender Location MembershipLevel Occupation
ID	INTERVAL	2	CustomerID _dataobs_

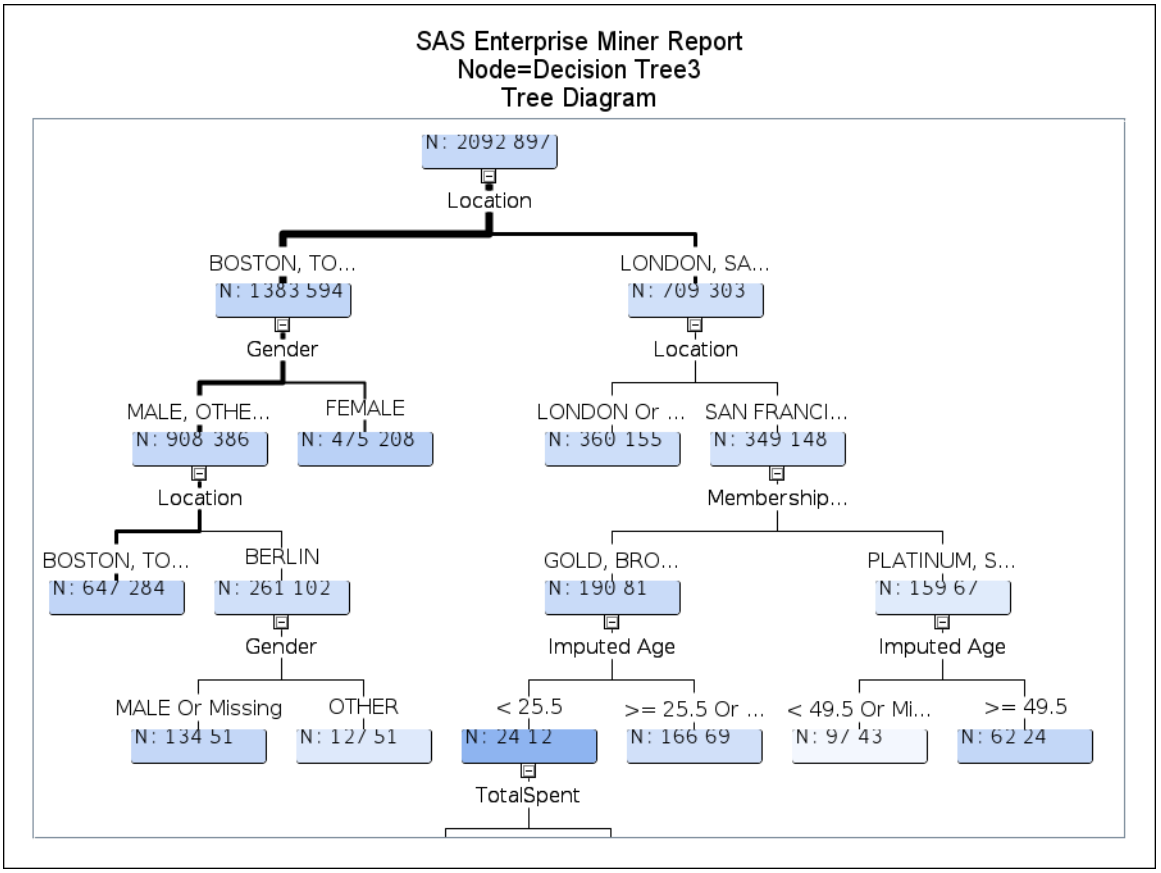
Node=Decision Tree3
Model Fit Statistics

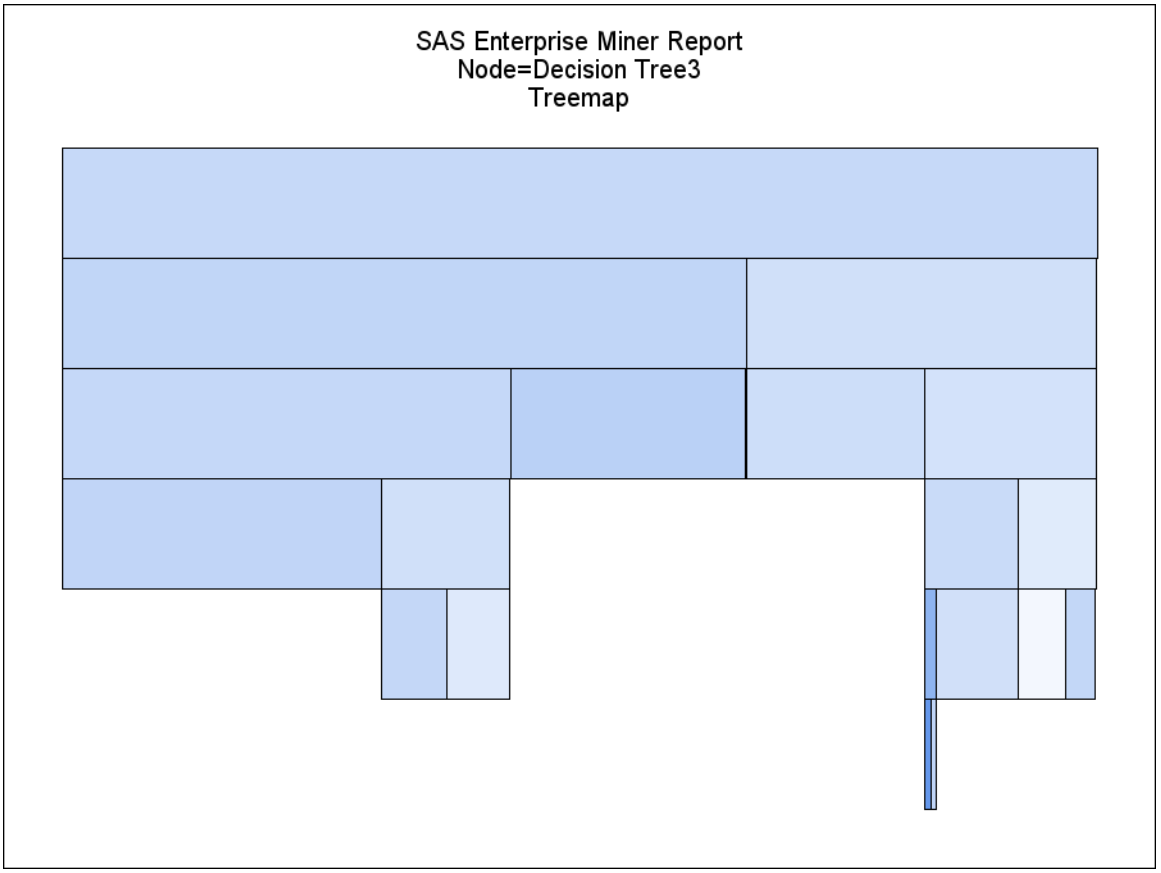
Target=Churn Target Label=''

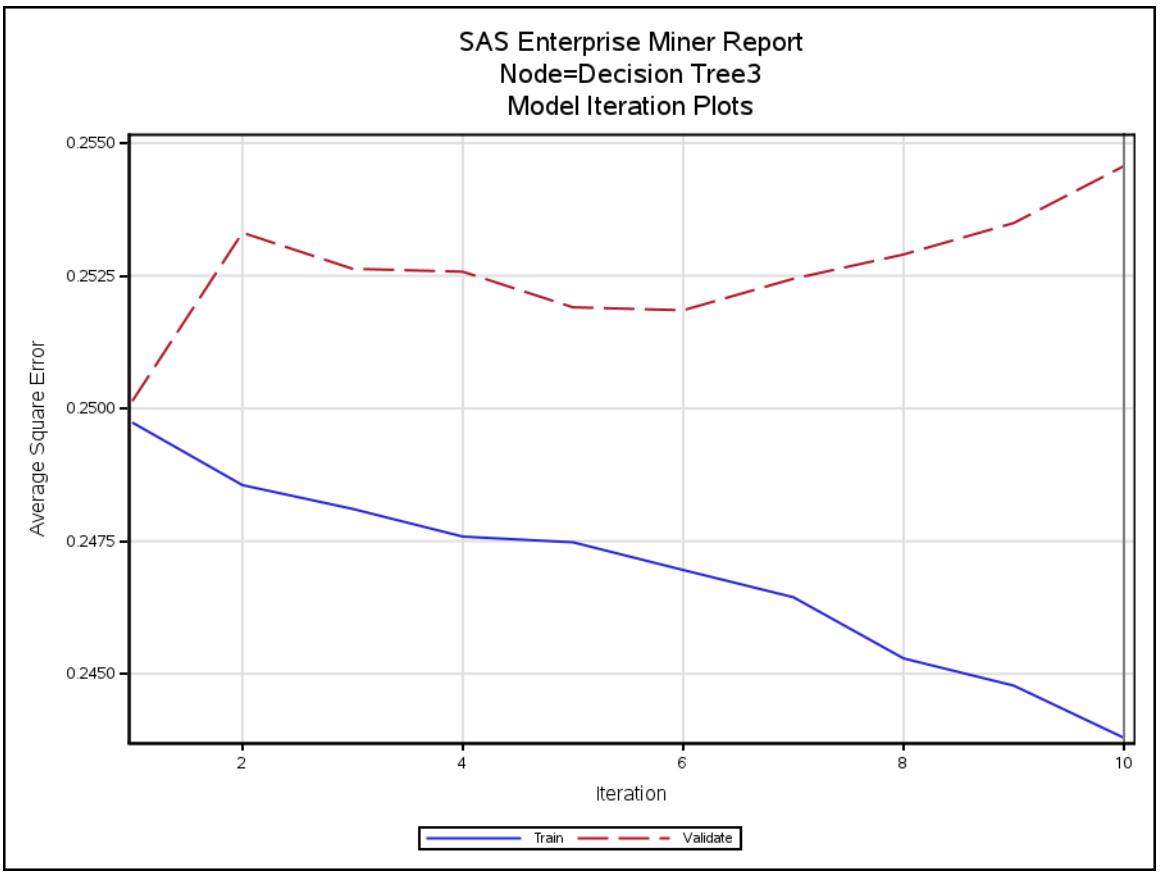
Label of Statistic	Train	Validation	Test
Sum of Frequencies	2092.00	897.000	.
Maximum Absolute Error	0.70	1.000	.
Sum of Squared Errors	510.02	228.347	.
Average Squared Error	0.24	0.255	.
Root Average Squared Error	0.49	0.505	.

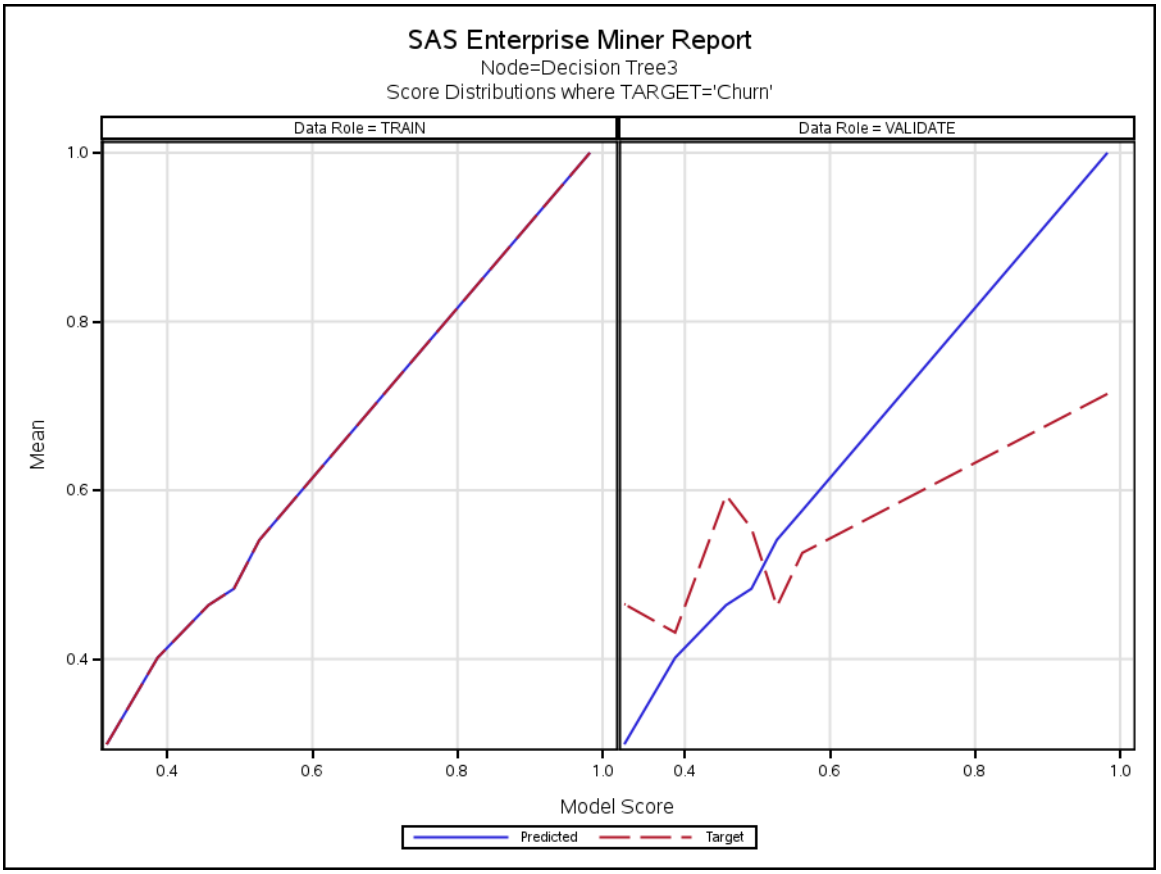
Target=Churn Target Label=''

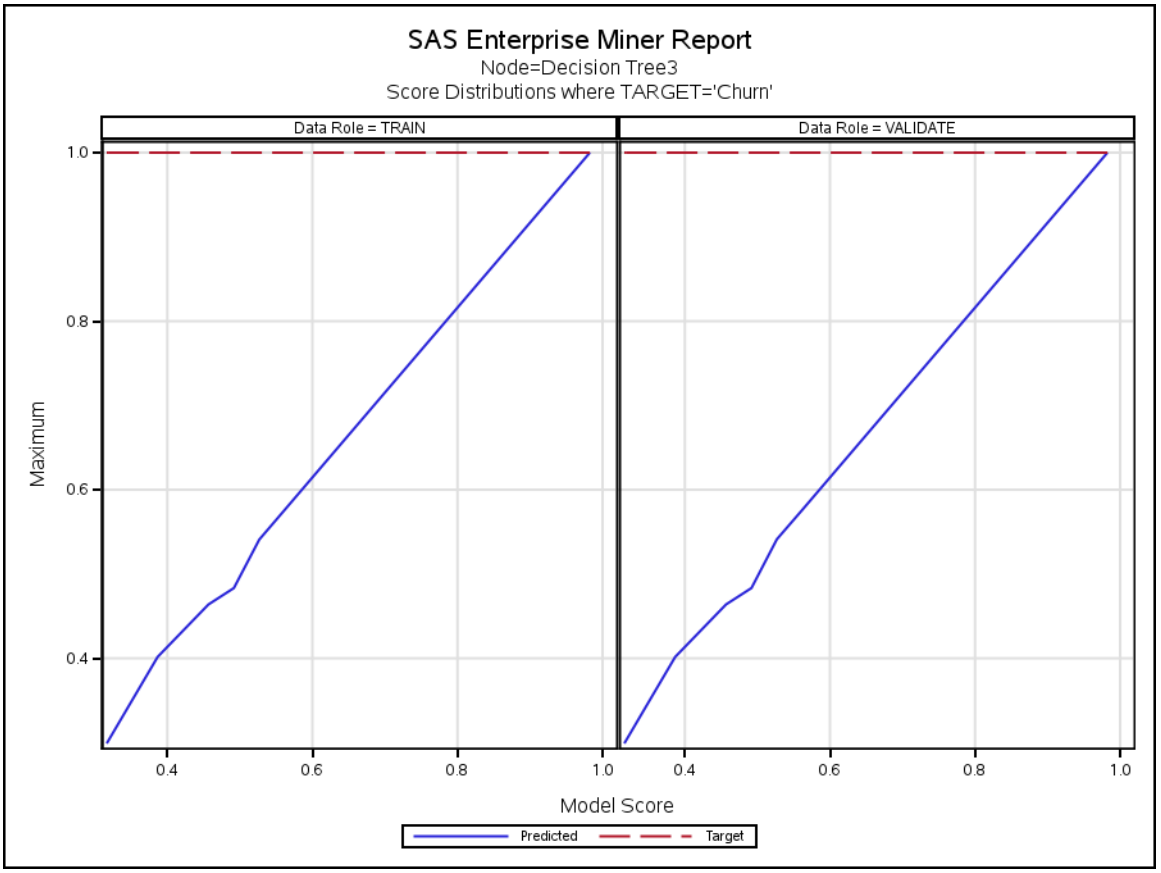
Label of Statistic	Train	Validation	Test
Divisor for ASE	2092.00	897.000	.
Total Degrees of Freedom	2092.00	.	.






SAS Enterprise Miner Report
Node=Decision Tree3
Model Iteration Plots
Average Square Error
0.2550
0.2525
0.2500
0.2475
0.2450
2
4
6
8
10
Iteration
Train
Validate


SAS Enterprise Miner Report
Node=Decision Tree3
Score Distributions where TARGET='Churn'
Data Role = TRAIN
Data Role = VALIDATE
Mean
1.0
0.8
0.6
0.4
0.4
0.6
0.8
1.0
Model Score
Predicted
Target



Node=Decision Tree3
Score Distributions

Target Variable=Churn Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.965 - 1.000	1.00000	1.00000	1.00000	1.00000	1	1
0.544 - 0.579	0.57613	0.57684	0.54545	0.57613	1	0
0.509 - 0.544	0.54093	0.54405	0.52985	0.54093	1	0
0.474 - 0.509	0.48333	0.48333	0.48333	0.48333	1	0
0.439 - 0.474	0.46386	0.46386	0.46386	0.46386	1	0
0.369 - 0.404	0.40157	0.40157	0.40157	0.40157	1	0
0.299 - 0.334	0.29897	0.29897	0.29897	0.29897	1	0

Target Variable=Churn Data Role=VALIDATE

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.965 - 1.000	1.00000	1.00000	1.00000	0.71429	1	0
0.544 - 0.579	0.57611	0.57684	0.54545	0.52582	1	0
0.509 - 0.544	0.54124	0.54405	0.52985	0.46240	1	0
0.474 - 0.509	0.48333	0.48333	0.48333	0.55484	1	0
0.439 - 0.474	0.46386	0.46386	0.46386	0.59420	1	0
0.369 - 0.404	0.40157	0.40157	0.40157	0.43137	1	0
0.299 - 0.334	0.29897	0.29897	0.29897	0.46512	1	0

SAS Enterprise Miner Report

Node=Decision Tree 1
Summary

Node id = Tree
Node label = Decision Tree 1
Meta path = Ids => Stat => Impt => Stat2 => Part => Tree
Notes =

Node=Decision Tree 1
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 1
Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Churn
INPUT	BINARY	2	M_Age M_TotalPurchases
INPUT	INTERVAL	4	IMP_Age IMP_TotalPurchases LastPurchaseDate TotalSpent
INPUT	NOMINAL	5	FavoriteCategory Gender Location MembershipLevel Occupation
ID	INTERVAL	2	CustomerID _dataobs_

Node=Decision Tree 1
Model Fit Statistics

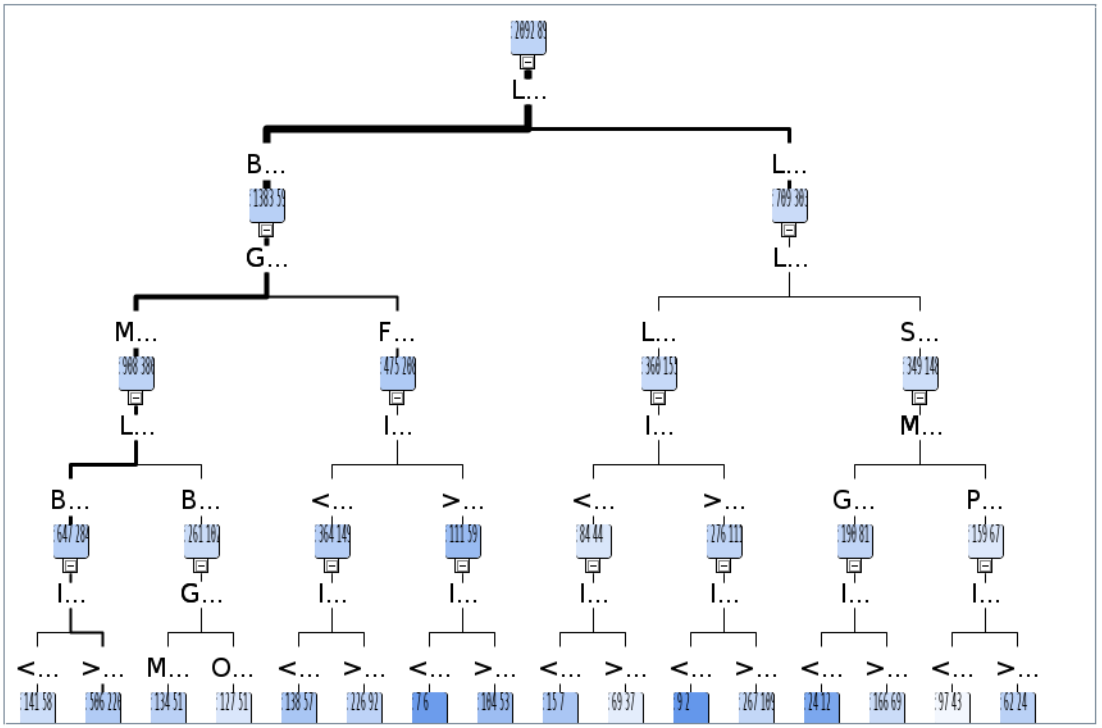
Target=Churn Target Label=''

Label of Statistic	Train	Validation	Test
Sum of Frequencies	2092.00	897.000	.
Maximum Absolute Error	0.89	0.889	.
Sum of Squared Errors	505.01	231.930	.
Average Squared Error	0.24	0.259	.
Root Average Squared Error	0.49	0.508	.

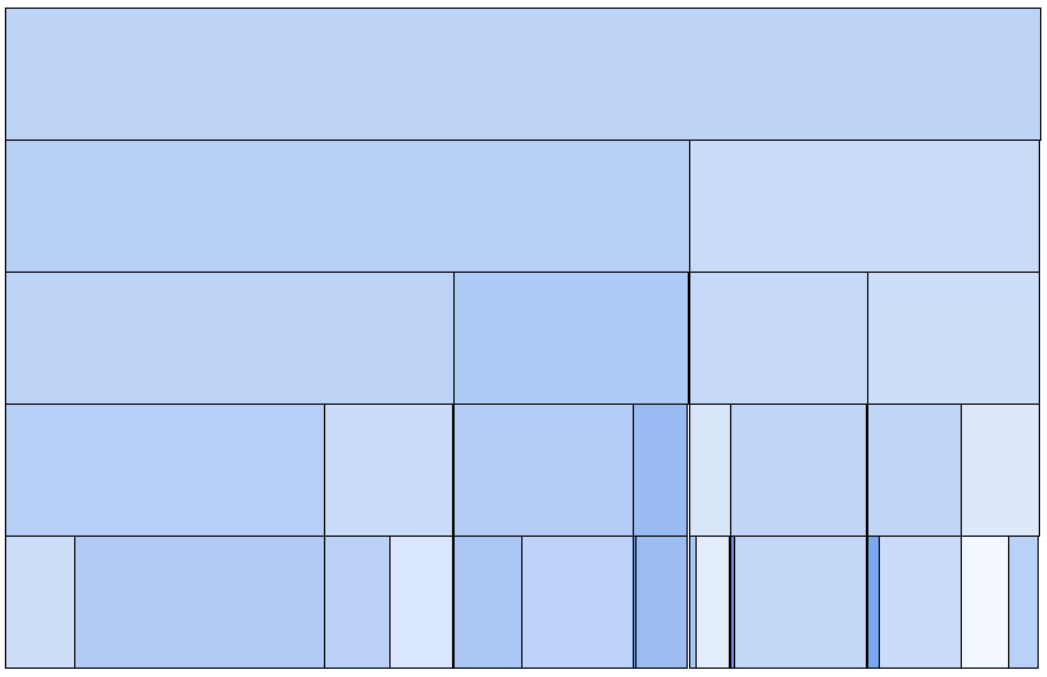
Target=Churn Target Label=' '

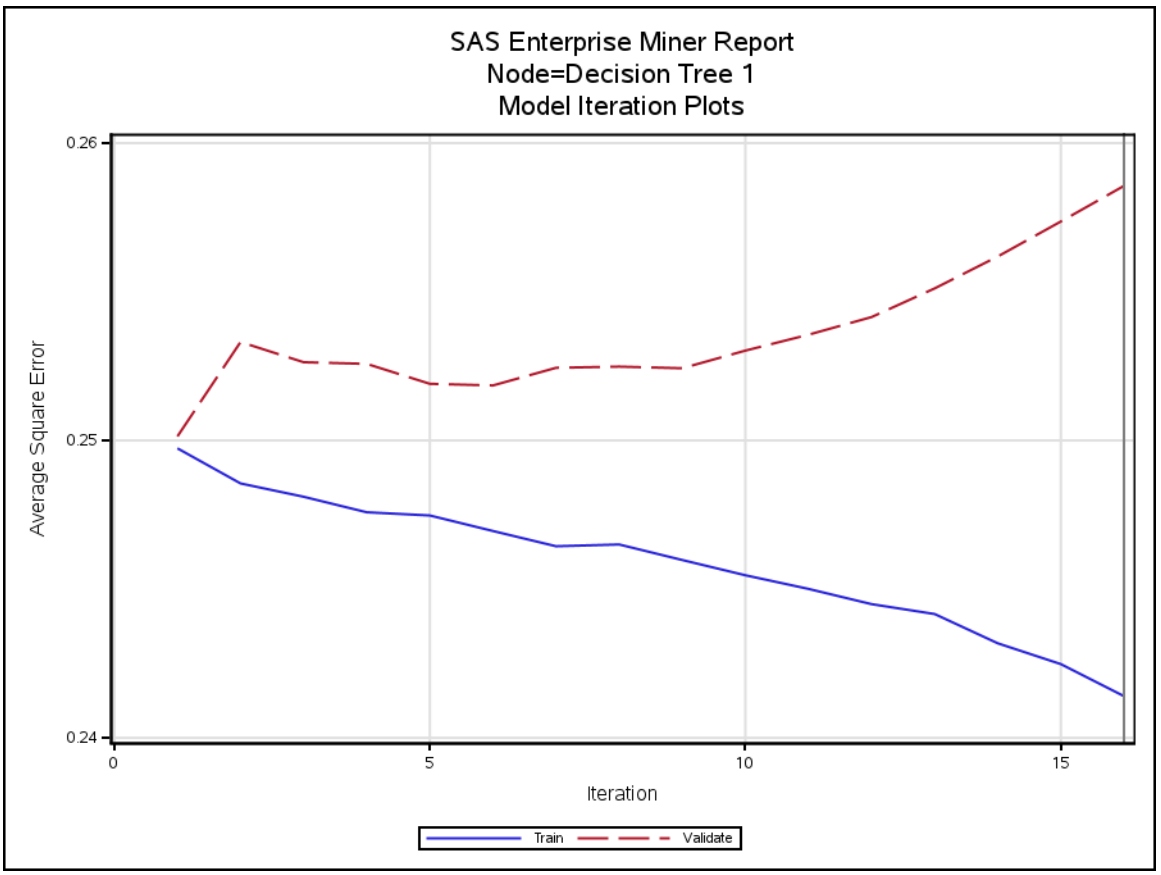
Label of Statistic	Train	Validation	Test
Divisor for ASE	2092.00	897.000	.
Total Degrees of Freedom	2092.00	.	.

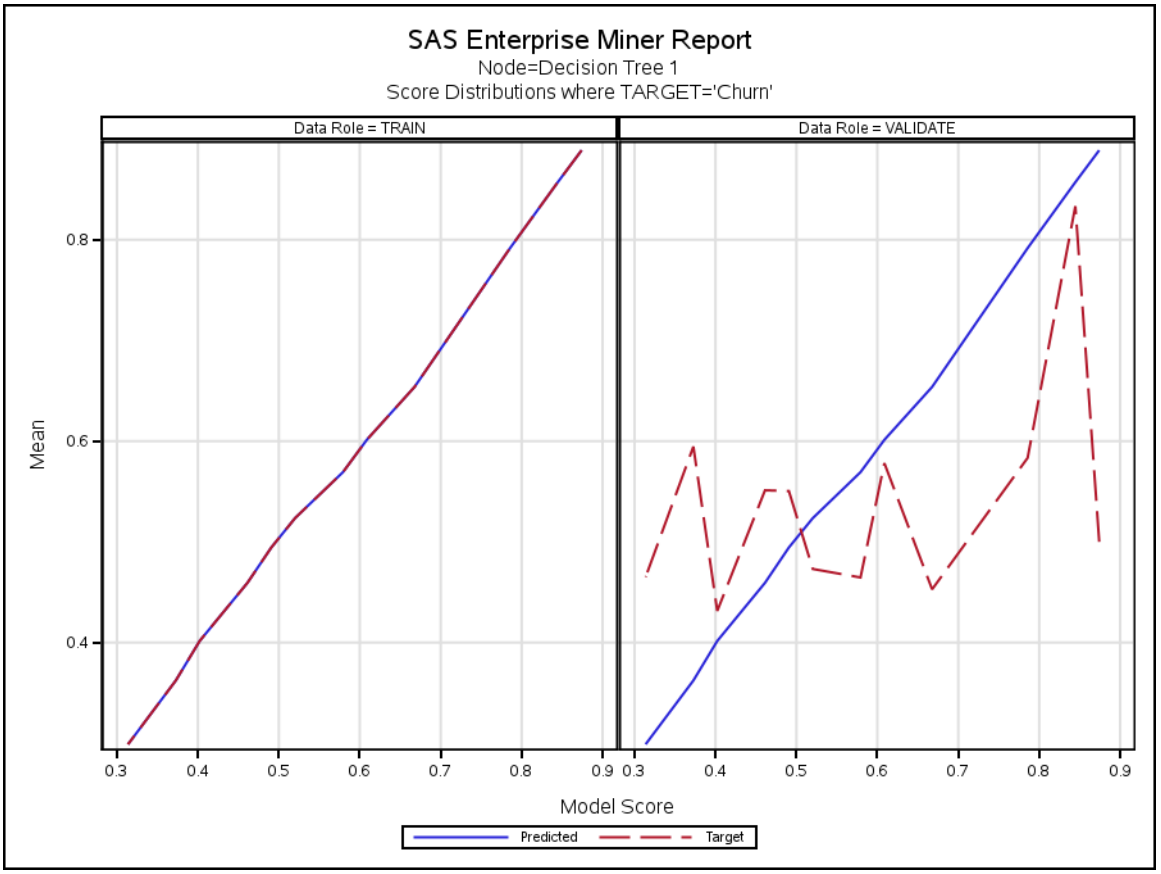
SAS Enterprise Miner Report
Node=Decision Tree 1
Tree Diagram

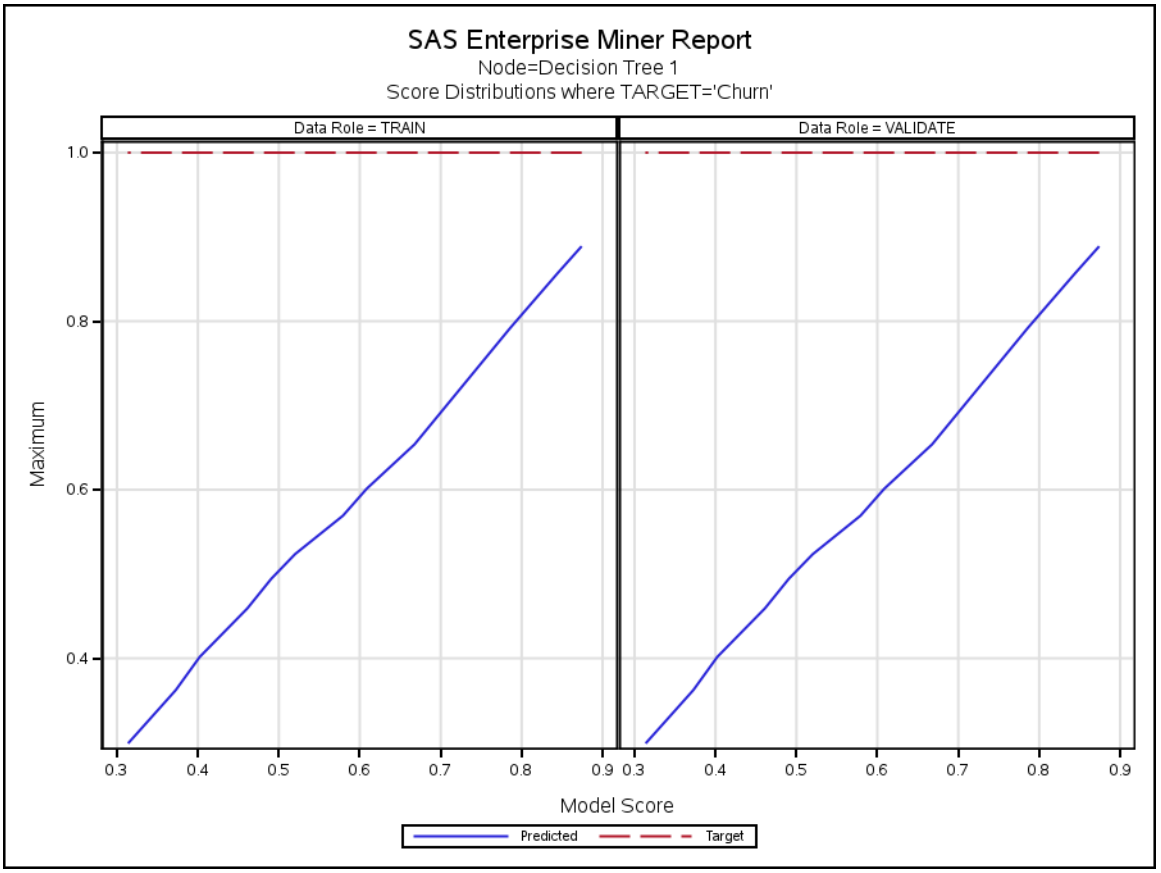


SAS Enterprise Miner Report
Node=Decision Tree 1
Treemap




SAS Enterprise Miner Report
Node=Decision Tree 1
Model Iteration Plots
Average Square Error
0.26
0.25
0.24
0
5
10
15
Iteration
Train
Validate


SAS Enterprise Miner Report
Node=Decision Tree 1
Score Distributions where TARGET='Churn'
Data Role = TRAIN
Data Role = VALIDATE
Mean
0.8
0.6
0.4
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Model Score
Predicted
Target



Node=Decision Tree 1
Score Distributions

Target Variable=Churn Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.859 - 0.889	0.88889	0.88889	0.88889	0.88889	1	0
0.830 - 0.859	0.85714	0.85714	0.85714	0.85714	1	0
0.771 - 0.800	0.79167	0.79167	0.79167	0.79167	1	0
0.653 - 0.682	0.65385	0.65385	0.65385	0.65385	1	0
0.594 - 0.623	0.60131	0.60145	0.60000	0.60131	1	0
0.564 - 0.594	0.56917	0.56917	0.56917	0.56917	1	0
0.505 - 0.535	0.52370	0.53226	0.51770	0.52370	1	0
0.476 - 0.505	0.49438	0.49438	0.49438	0.49438	1	0
0.446 - 0.476	0.45928	0.46386	0.45390	0.45928	1	0
0.387 - 0.417	0.40157	0.40157	0.40157	0.40157	1	0
0.358 - 0.387	0.36232	0.36232	0.36232	0.36232	1	0
0.299 - 0.328	0.29897	0.29897	0.29897	0.29897	1	0

Target Variable=Churn Data Role=VALIDATE

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.859 - 0.889	0.88889	0.88889	0.88889	0.50000	1	0
0.830 - 0.859	0.85714	0.85714	0.85714	0.83333	1	0
0.771 - 0.800	0.79167	0.79167	0.79167	0.58333	1	0
0.653 - 0.682	0.65385	0.65385	0.65385	0.45283	1	0
0.594 - 0.623	0.60129	0.60145	0.60000	0.57813	1	0
0.564 - 0.594	0.56917	0.56917	0.56917	0.46460	1	0
0.505 - 0.535	0.52350	0.53226	0.51770	0.47305	1	0
0.476 - 0.505	0.49438	0.49438	0.49438	0.55046	1	0
0.446 - 0.476	0.45931	0.46386	0.45390	0.55118	1	0
0.387 - 0.417	0.40157	0.40157	0.40157	0.43137	1	0
0.358 - 0.387	0.36232	0.36232	0.36232	0.59459	1	0
0.299 - 0.328	0.29897	0.29897	0.29897	0.46512	1	0

SAS Enterprise Miner Report

Node=Decision Tree (2split) Summary

Node id = Tree4
Node label = Decision Tree (2split)
Meta path = Ids => Stat => Impt => Stat2 => Part => Tree4
Notes =

Node=Decision Tree (2split) 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 (2split) Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Churn
INPUT	BINARY	2	M_Age M_TotalPurchases
INPUT	INTERVAL	4	IMP_Age IMP_TotalPurchases LastPurchaseDate TotalSpent
INPUT	NOMINAL	5	FavoriteCategory Gender Location MembershipLevel Occupation
ID	INTERVAL	2	CustomerID _dataobs_

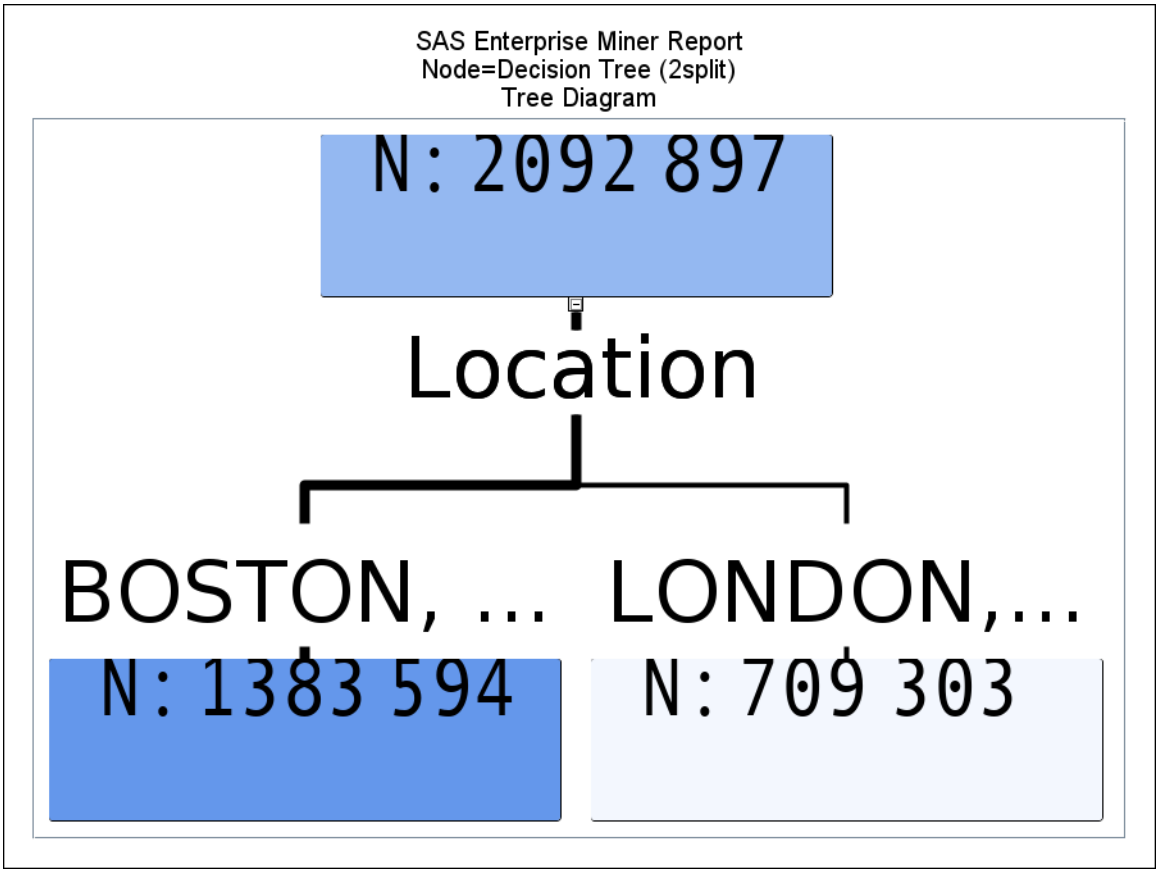
Node=Decision Tree (2split) Model Fit Statistics

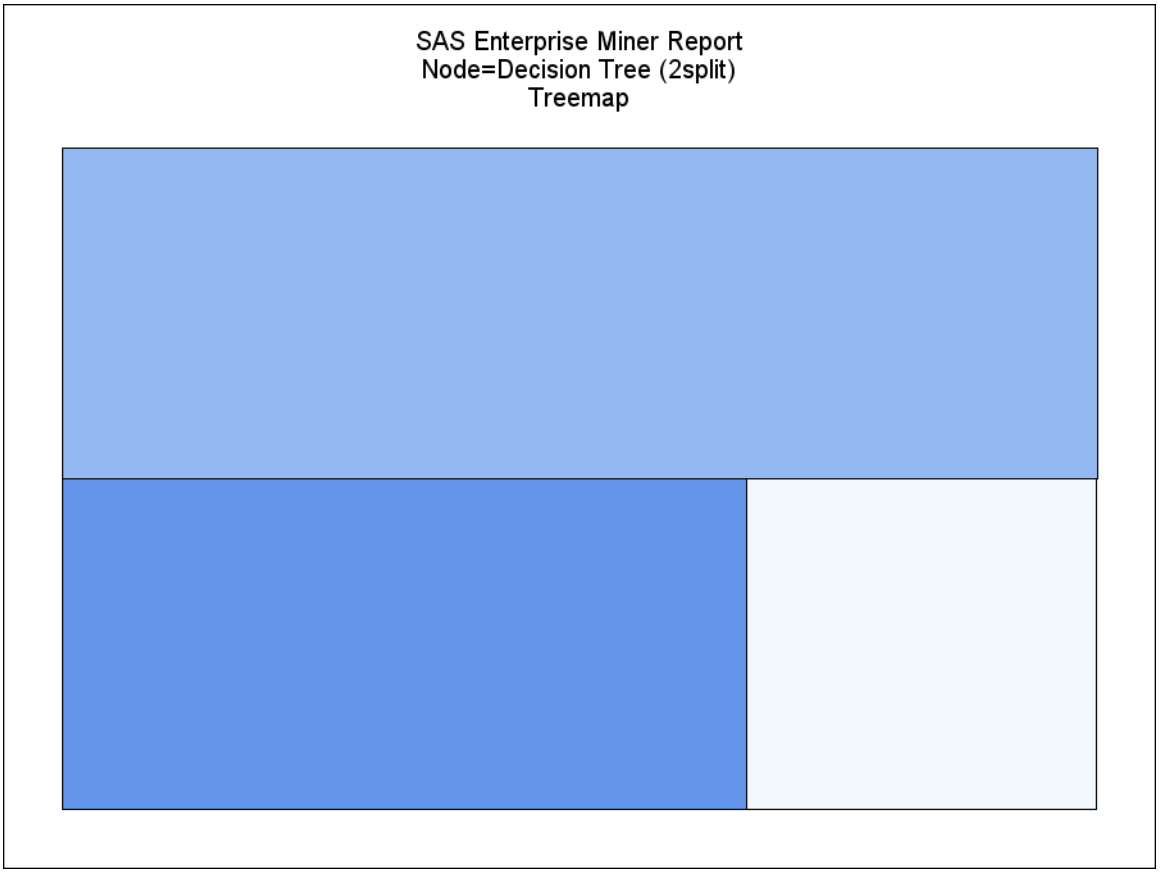
Target=Churn Target Label=' '

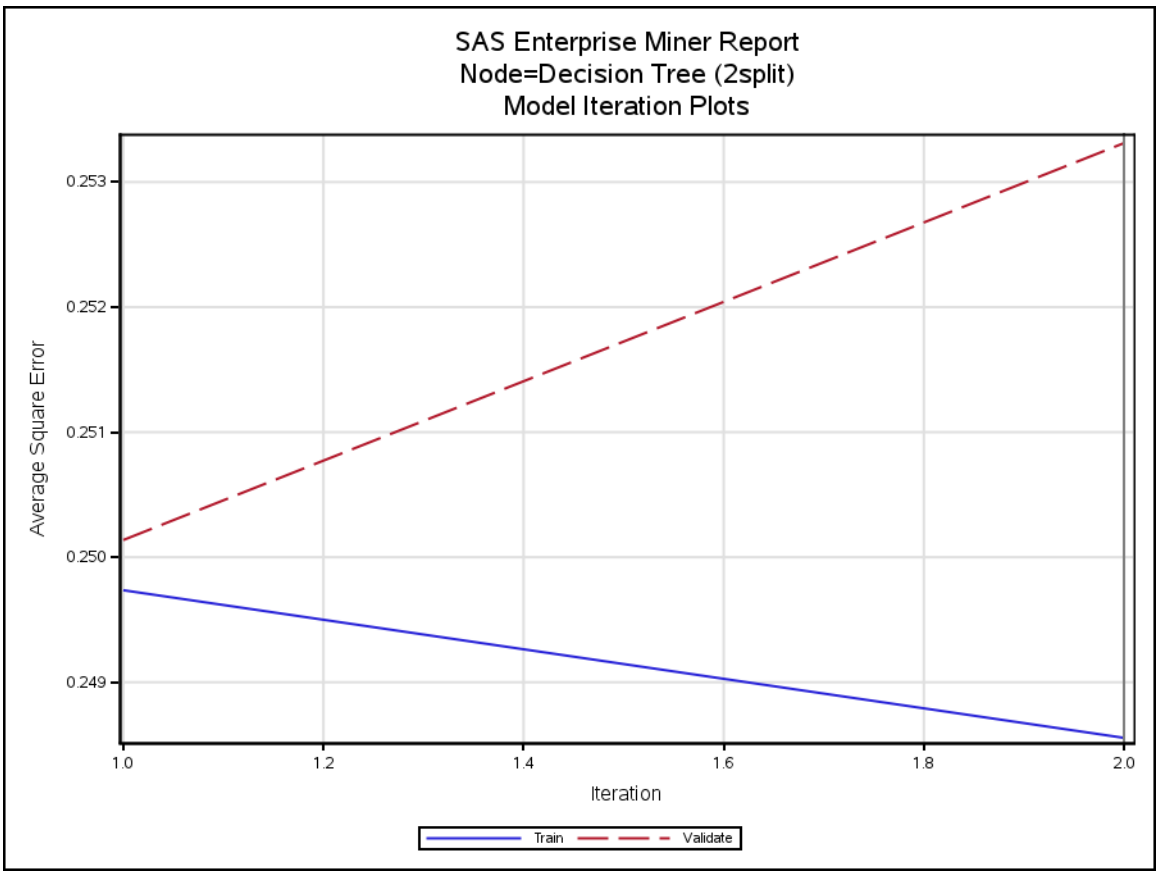
Label of Statistic	Train	Validation	Test
Sum of Frequencies	2092.00	897.000	.
Maximum Absolute Error	0.54	0.541	.
Sum of Squared Errors	519.98	227.220	.
Average Squared Error	0.25	0.253	.
Root Average Squared Error	0.50	0.503	.

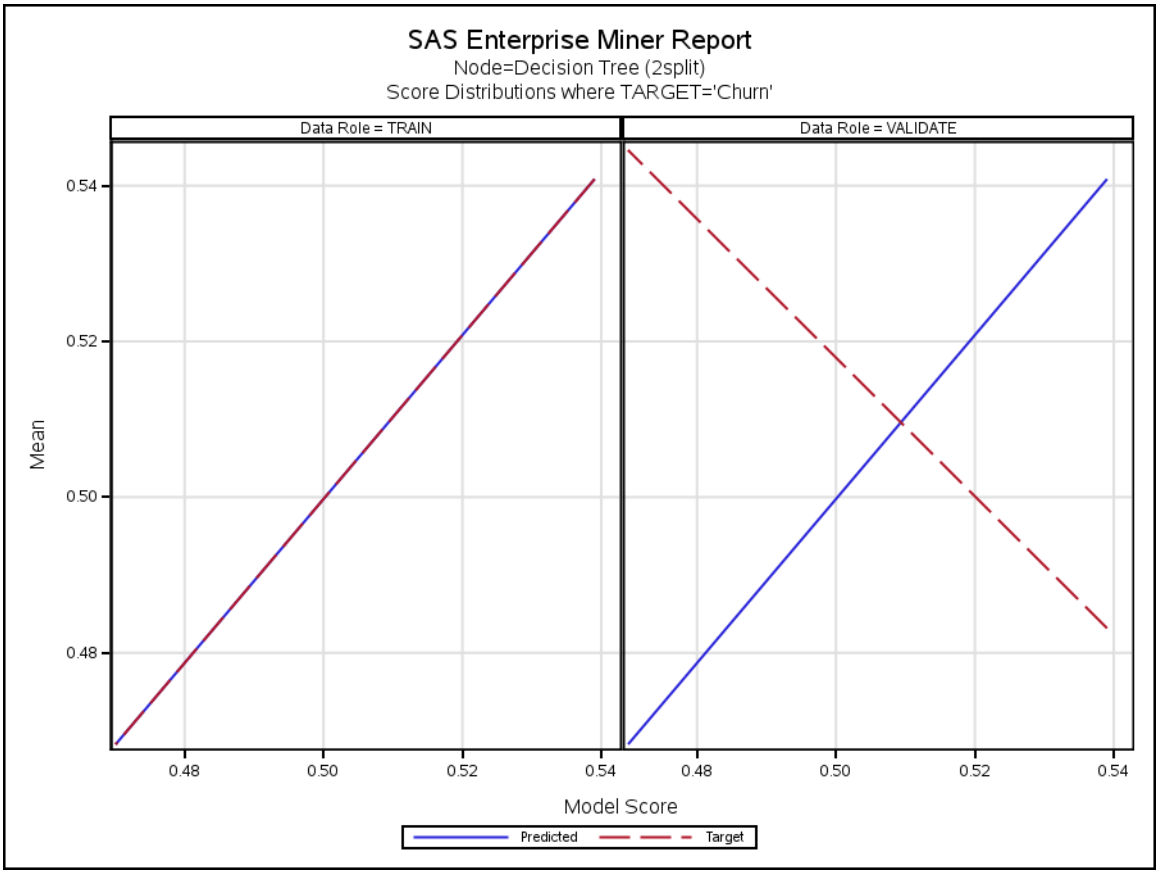
Target=Churn Target Label=''

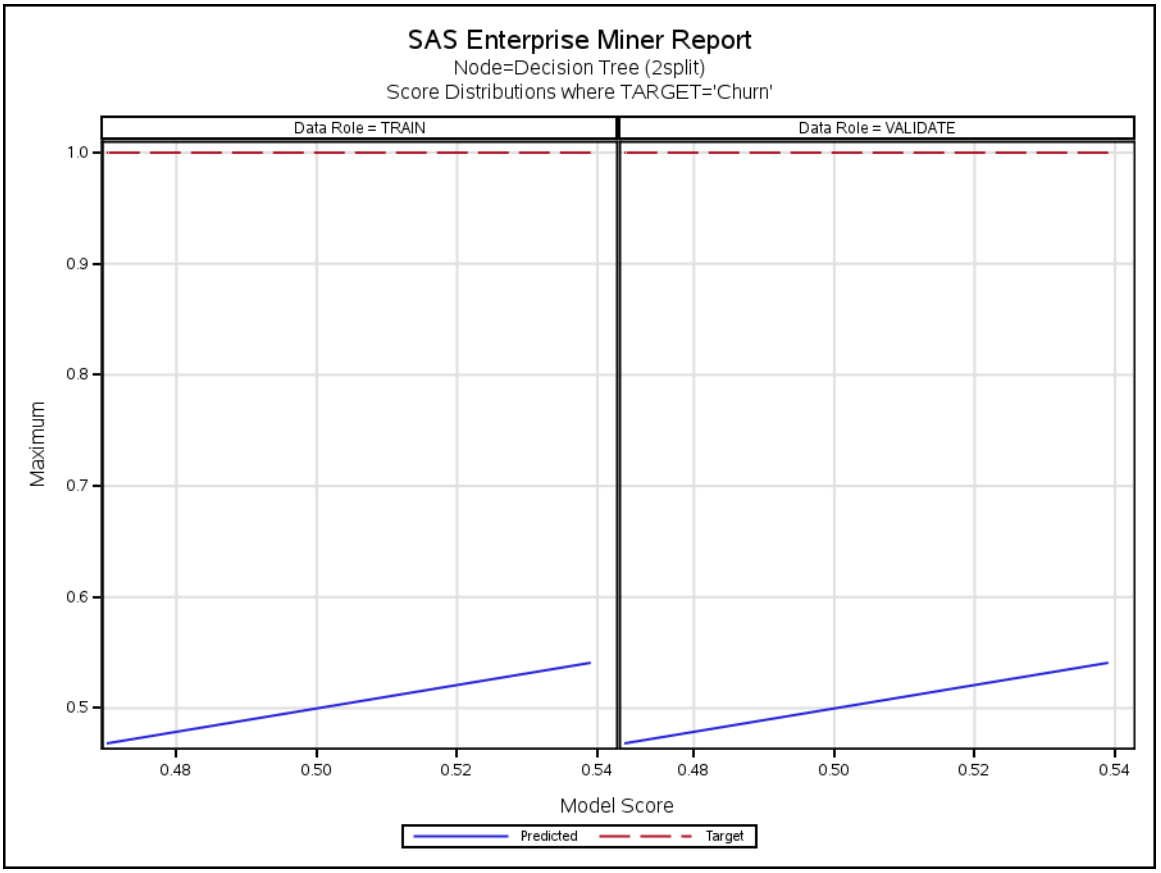
Label of Statistic	Train	Validation	Test
Divisor for ASE	2092.00	897.000	.
Total Degrees of Freedom	2092.00	.	.






SAS Enterprise Miner Report
Node=Decision Tree (2split)
Model Iteration Plots
Average Square Error
0.253
0.252
0.251
0.250
0.249
1.0
1.2
1.4
1.6
1.8
2.0
Iteration
Train
Validate


SAS Enterprise Miner Report
Node=Decision Tree (2split)
Score Distributions where TARGET='Churn'
Data Role = TRAIN
Data Role = VALIDATE
Mean
0.54
0.52
0.50
0.48
0.48
0.50
0.52
0.54
Model Score
Predicted
Target



Node=Decision Tree (2split)
Score Distributions

Target Variable=Churn Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.537 - 0.541	0.54085	0.54085	0.54085	0.54085	1	0
0.468 - 0.472	0.46827	0.46827	0.46827	0.46827	1	0

Target Variable=Churn Data Role=VALIDATE

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.537 - 0.541	0.54085	0.54085	0.54085	0.48316	1	0
0.468 - 0.472	0.46827	0.46827	0.46827	0.54455	1	0

SAS Enterprise Miner Report

Node=Decision Tree (3split) Summary

Node id = Tree5
Node label = Decision Tree (3split)
Meta path = Ids => Stat => Impt => Stat2 => Part => Tree5
Notes =

Node=Decision Tree (3split) 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 (3split) Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Churn
INPUT	BINARY	2	M_Age M_TotalPurchases
INPUT	INTERVAL	4	IMP_Age IMP_TotalPurchases LastPurchaseDate TotalSpent
INPUT	NOMINAL	5	FavoriteCategory Gender Location MembershipLevel Occupation
ID	INTERVAL	2	CustomerID _dataobs_

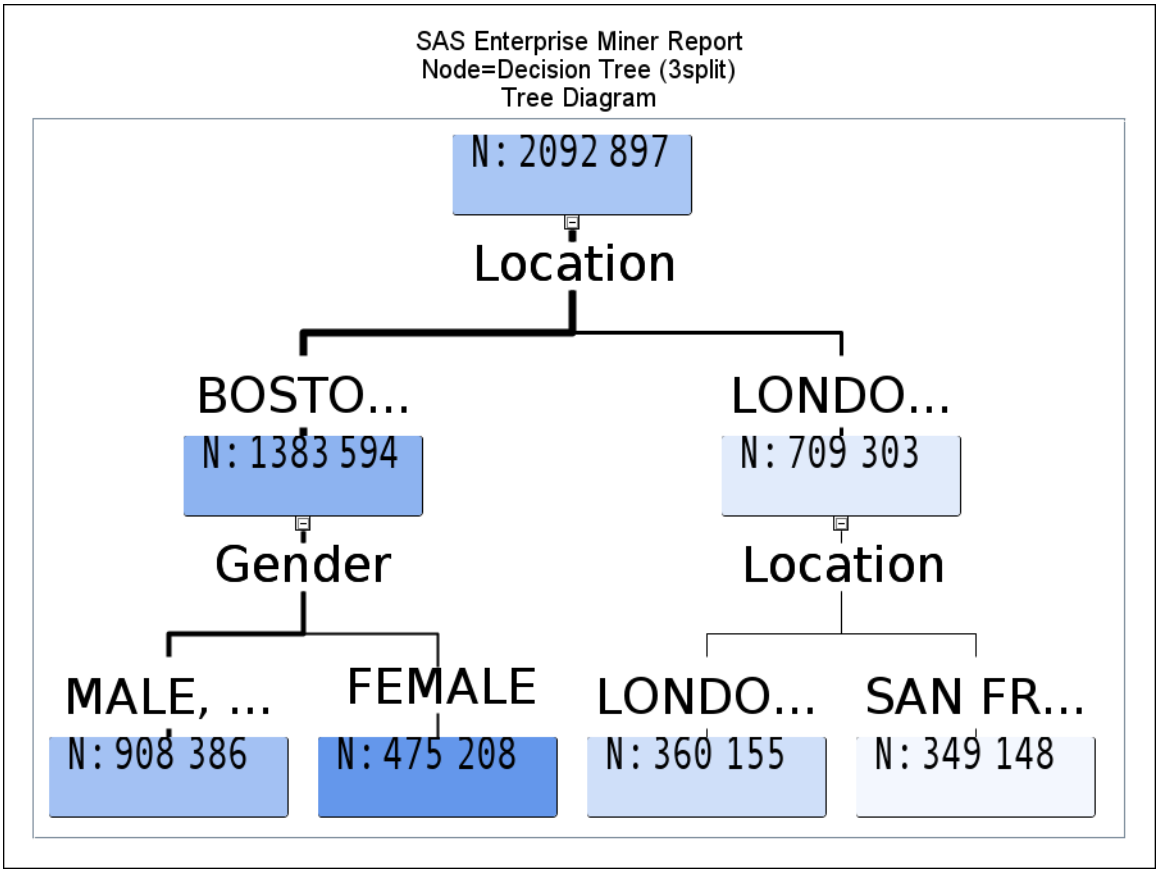
Node=Decision Tree (3split) Model Fit Statistics

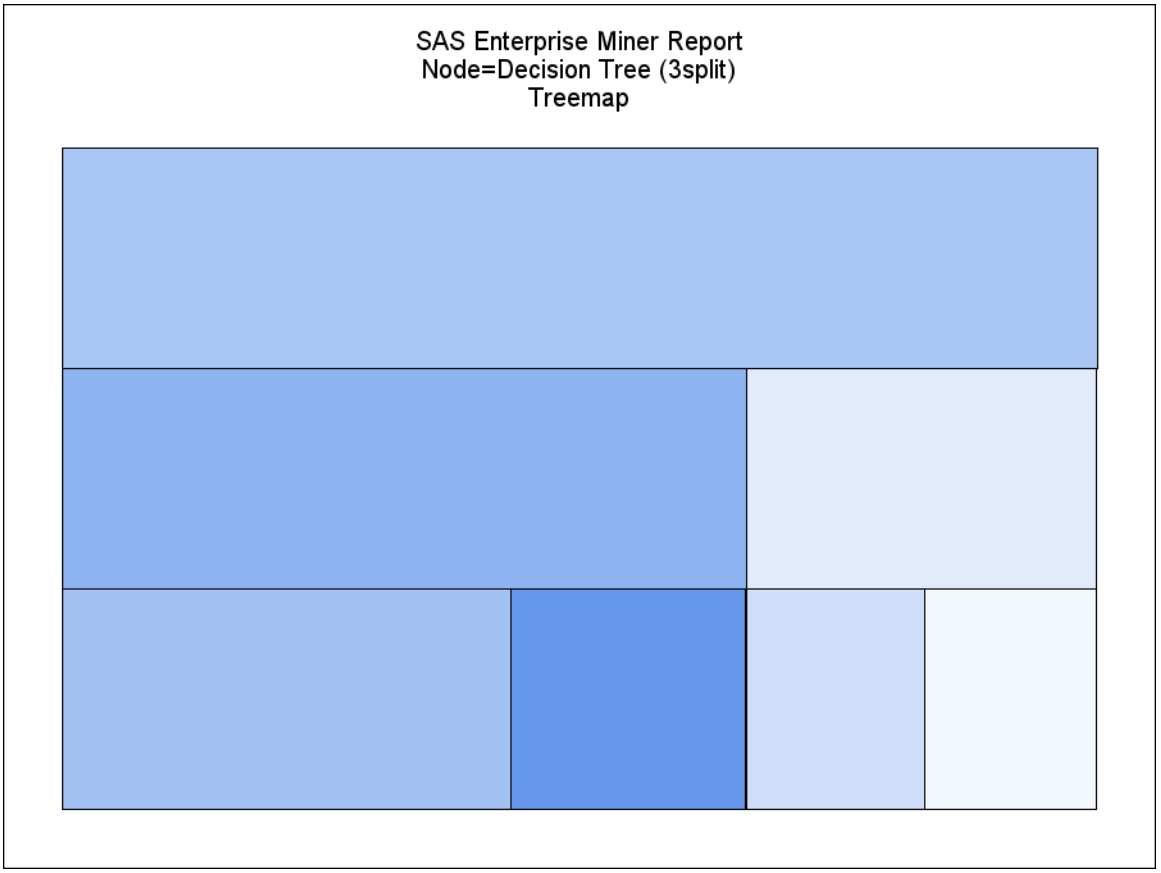
Target=Churn Target Label=' '

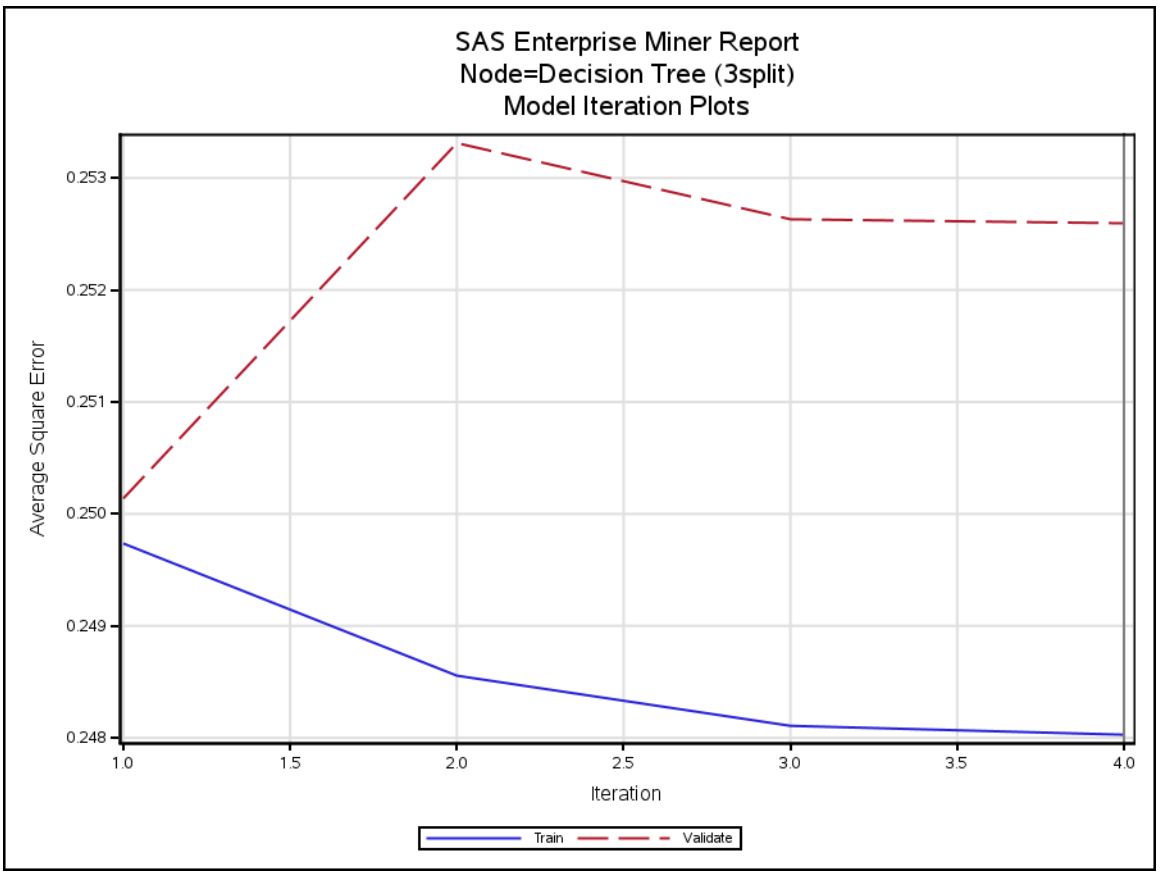
Label of Statistic	Train	Validation	Test
Sum of Frequencies	2092.00	897.000	.
Maximum Absolute Error	0.58	0.577	.
Sum of Squared Errors	518.87	226.578	.
Average Squared Error	0.25	0.253	.
Root Average Squared Error	0.50	0.503	.

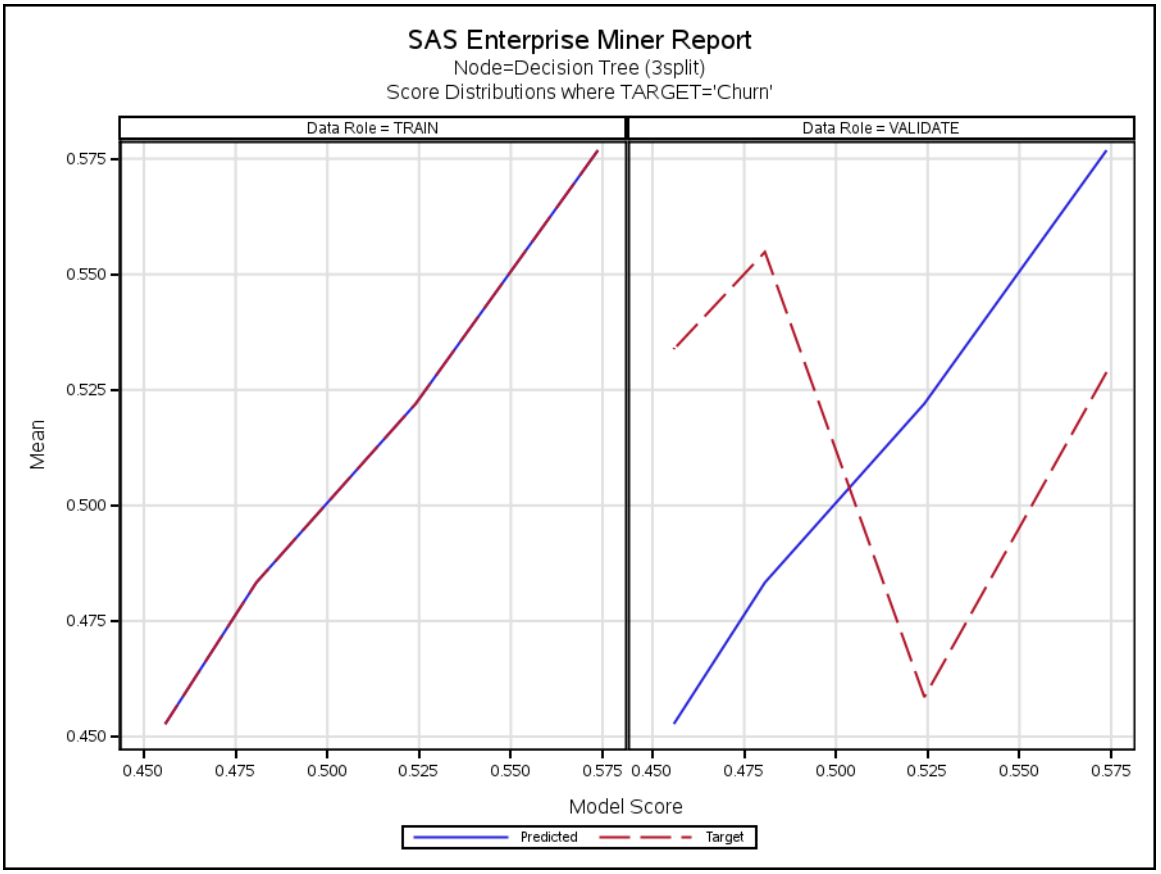
Target=Churn Target Label=''

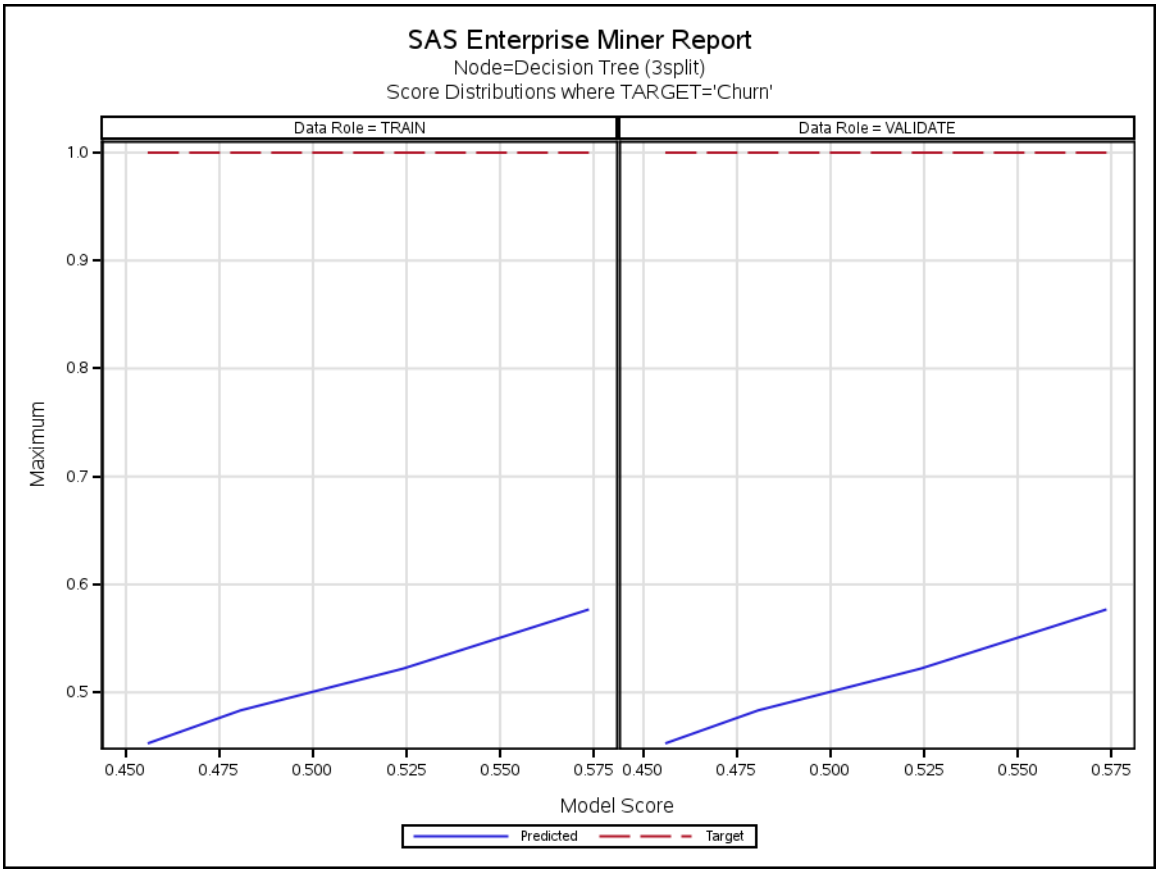
Label of Statistic	Train	Validation	Test
Divisor for ASE	2092.00	897.000	.
Total Degrees of Freedom	2092.00	.	.






SAS Enterprise Miner Report
Node=Decision Tree (3split)
Model Iteration Plots
Average Square Error
0.253
0.252
0.251
0.250
0.249
0.248
1.0
1.5
2.0
2.5
3.0
3.5
4.0
Iteration
Train
Validate


SAS Enterprise Miner Report
Node=Decision Tree (3split)
Score Distributions where TARGET='Churn'
Data Role = TRAIN
Data Role = VALIDATE
Mean
0.575
0.550
0.525
0.500
0.475
0.450
0.450
0.475
0.500
0.525
0.550
0.575
Model Score
Predicted
Target



Node=Decision Tree (3split)
Score Distributions

Target Variable=Churn Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.571 - 0.577	0.57684	0.57684	0.57684	0.57684	1	0
0.521 - 0.527	0.52203	0.52203	0.52203	0.52203	1	0
0.478 - 0.484	0.48333	0.48333	0.48333	0.48333	1	0
0.453 - 0.459	0.45272	0.45272	0.45272	0.45272	1	0

Target Variable=Churn Data Role=VALIDATE

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.571 - 0.577	0.57684	0.57684	0.57684	0.52885	1	0
0.521 - 0.527	0.52203	0.52203	0.52203	0.45855	1	0
0.478 - 0.484	0.48333	0.48333	0.48333	0.55484	1	0
0.453 - 0.459	0.45272	0.45272	0.45272	0.53378	1	0

SAS Enterprise Miner Report

Node=Decision Tree (4)
Summary

Node id = Tree6
Node label = Decision Tree (4)
Meta path = Ids => Stat => Impt => Stat2 => Part => Tree6
Notes =

Node=Decision Tree (4)
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 (4)
Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Churn
INPUT	BINARY	2	M_Age M_TotalPurchases
INPUT	INTERVAL	4	IMP_Age IMP_TotalPurchases LastPurchaseDate TotalSpent
INPUT	NOMINAL	5	FavoriteCategory Gender Location MembershipLevel Occupation
ID	INTERVAL	2	CustomerID _dataobs_

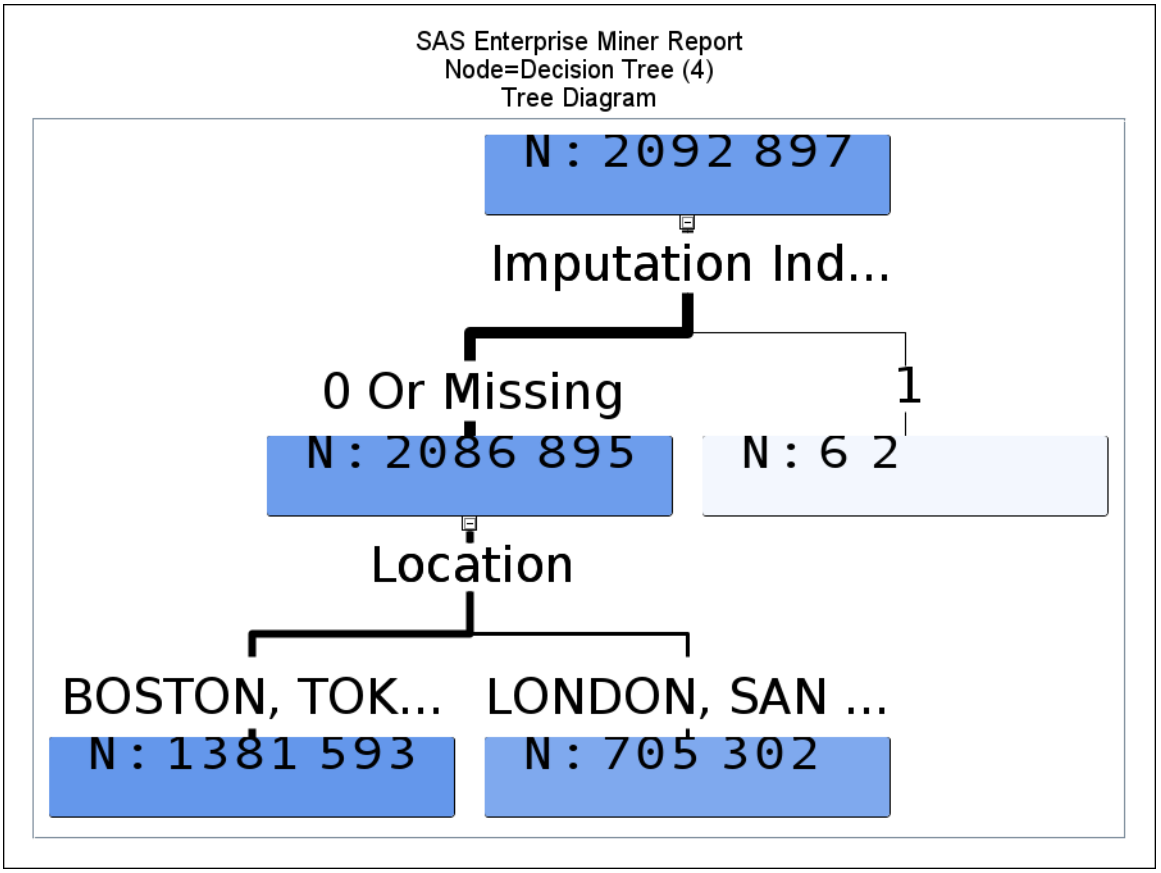
Node=Decision Tree (4)
Model Fit Statistics

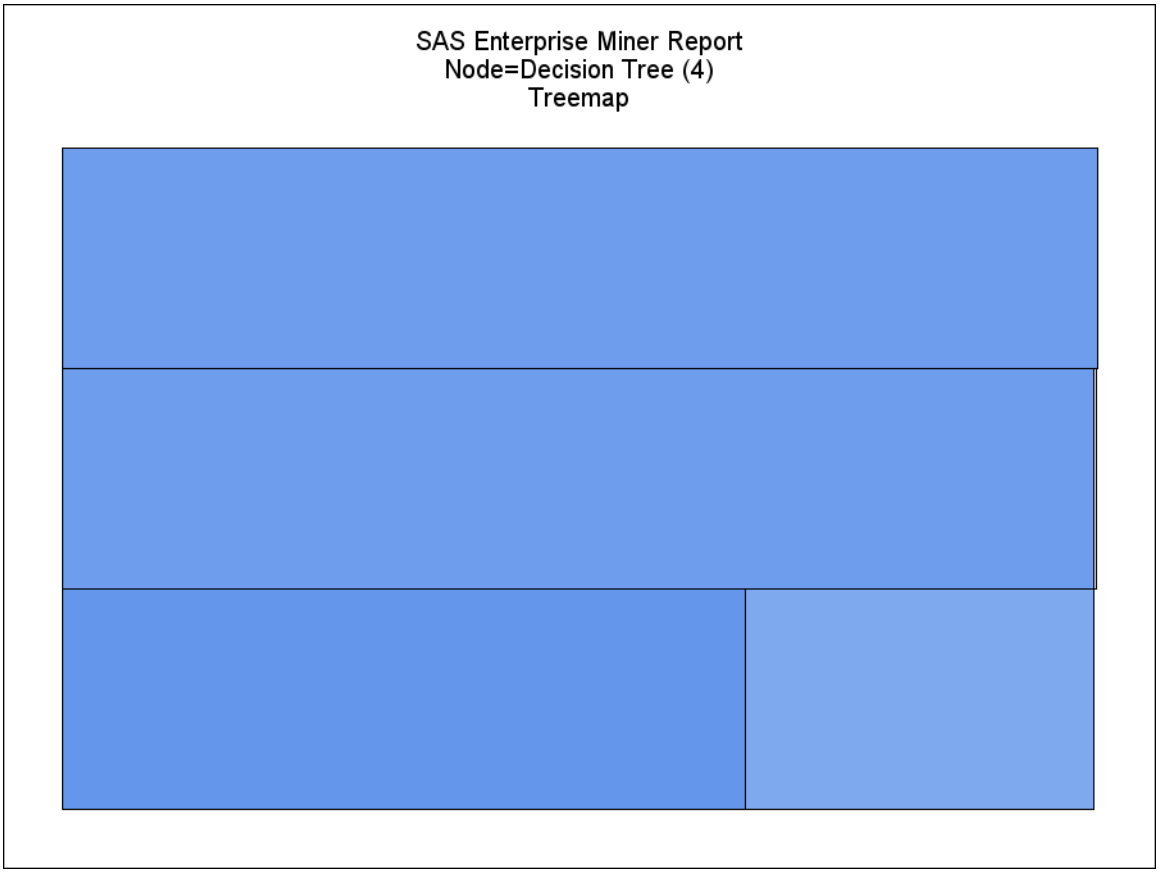
Target=Churn Target Label=''

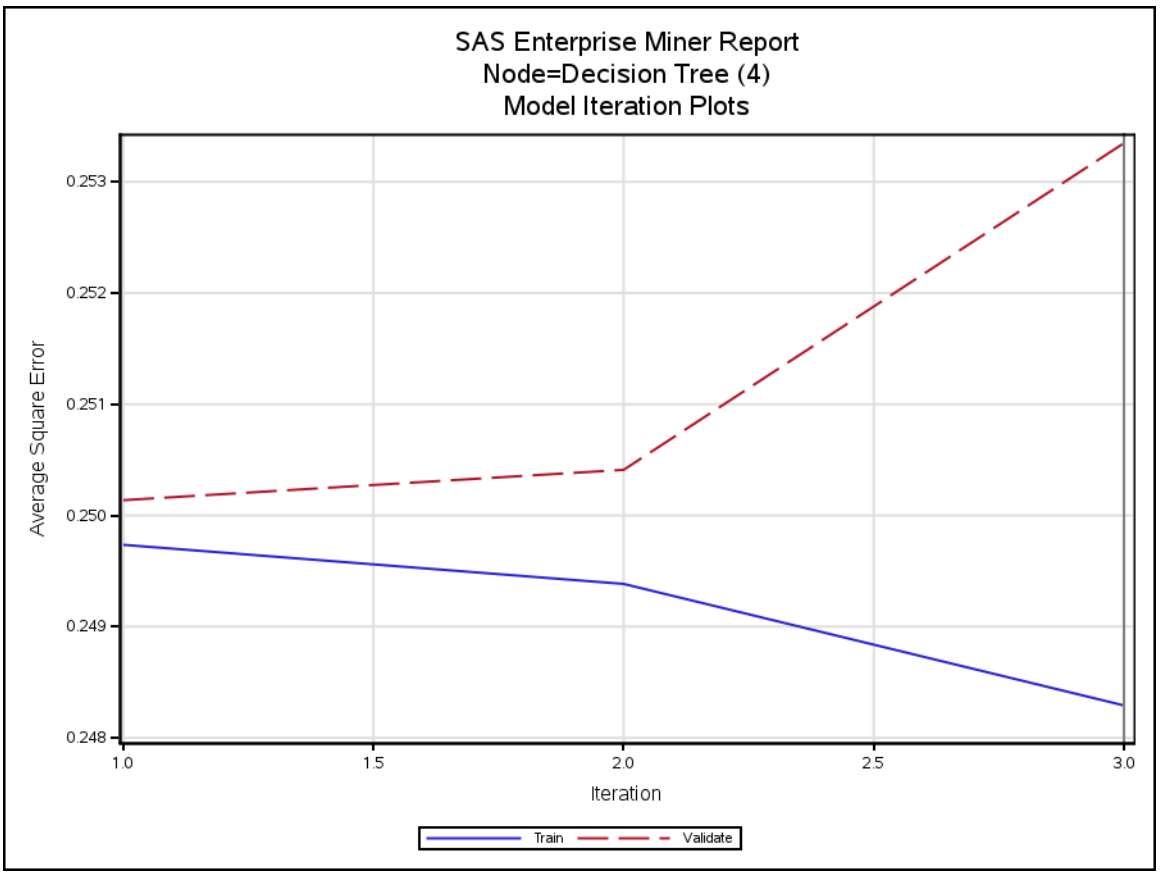
Label of Statistic	Train	Validation	Test
Sum of Frequencies	2092.00	897.000	.
Maximum Absolute Error	0.83	0.833	.
Sum of Squared Errors	519.43	227.254	.
Average Squared Error	0.25	0.253	.
Root Average Squared Error	0.50	0.503	.

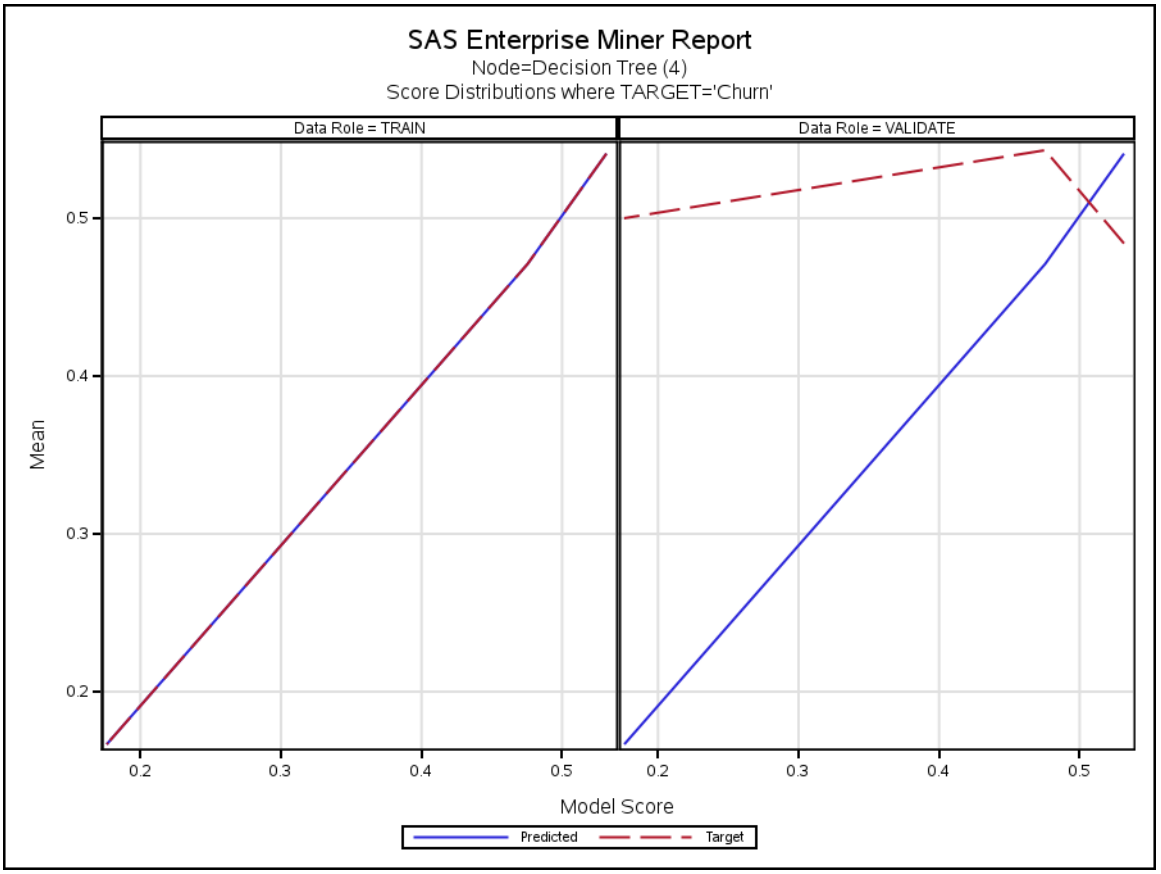
Target=Churn Target Label=''

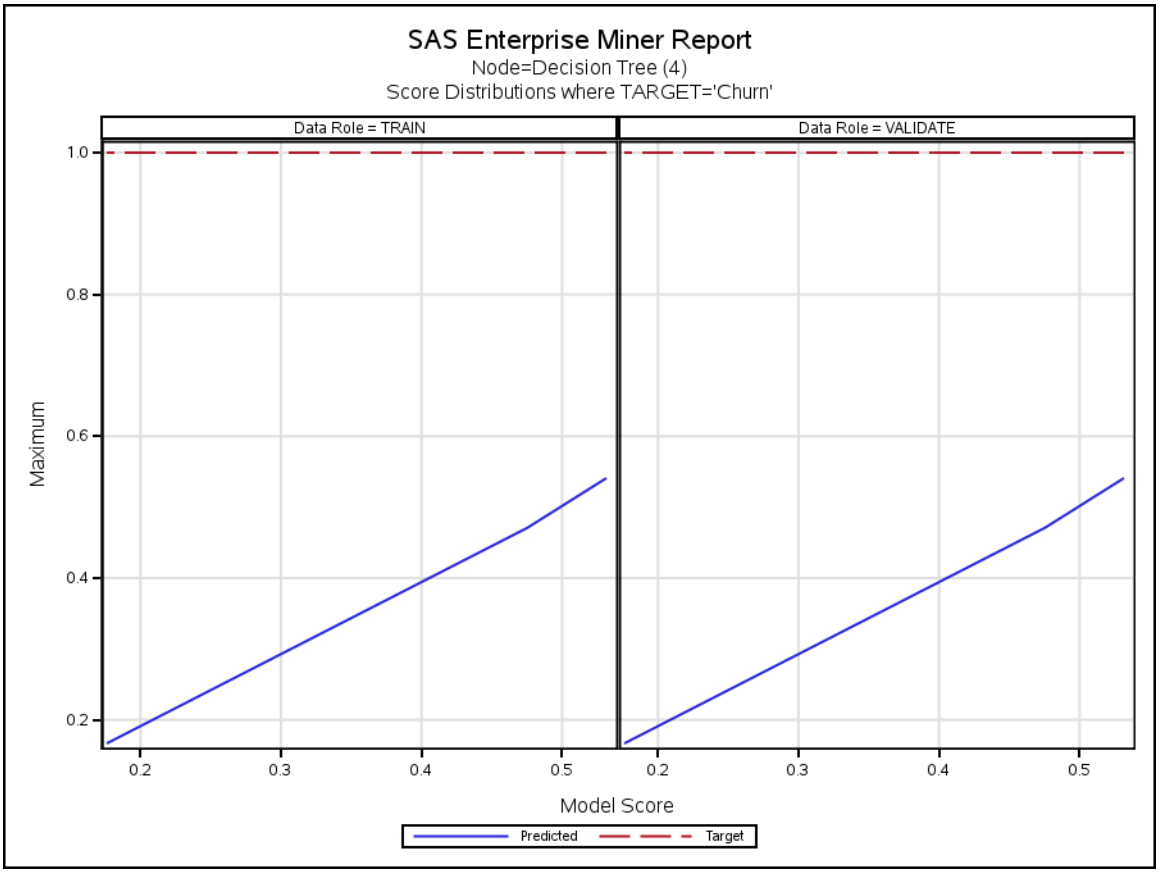
Label of Statistic	Train	Validation	Test
Divisor for ASE	2092.00	897.000	.
Total Degrees of Freedom	2092.00	.	.






SAS Enterprise Miner Report
Node=Decision Tree (4)
Model Iteration Plots
Average Square Error
0.253
0.252
0.251
0.250
0.249
0.248
1.0
1.5
2.0
2.5
3.0
Iteration
Train
Validate


SAS Enterprise Miner Report
Node=Decision Tree (4)
Score Distributions where TARGET='Churn'
Data Role = TRAIN
Data Role = VALIDATE
Mean
0.5
0.4
0.3
0.2
0.2
0.3
0.4
0.5
Model Score
Predicted
Target



Node=Decision Tree (4)
Score Distributions

Target Variable=Churn Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.522 - 0.541	0.54091	0.54091	0.54091	0.54091	1	0
0.466 - 0.485	0.47092	0.47092	0.47092	0.47092	1	0
0.167 - 0.185	0.16667	0.16667	0.16667	0.16667	1	0

Target Variable=Churn Data Role=VALIDATE

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.522 - 0.541	0.54091	0.54091	0.54091	0.48398	1	0
0.466 - 0.485	0.47092	0.47092	0.47092	0.54305	1	0
0.167 - 0.185	0.16667	0.16667	0.16667	0.50000	1	0

SAS Enterprise Miner Report

Node=Decision Tree (5)
Summary

Node id = Tree7
Node label = Decision Tree (5)
Meta path = Ids => Stat => Impt => Stat2 => Part => Tree7
Notes =

Node=Decision Tree (5)
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 (5)
Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Churn
INPUT	BINARY	2	M_Age M_TotalPurchases
INPUT	INTERVAL	4	IMP_Age IMP_TotalPurchases LastPurchaseDate TotalSpent
INPUT	NOMINAL	5	FavoriteCategory Gender Location MembershipLevel Occupation
ID	INTERVAL	2	CustomerID _dataobs_

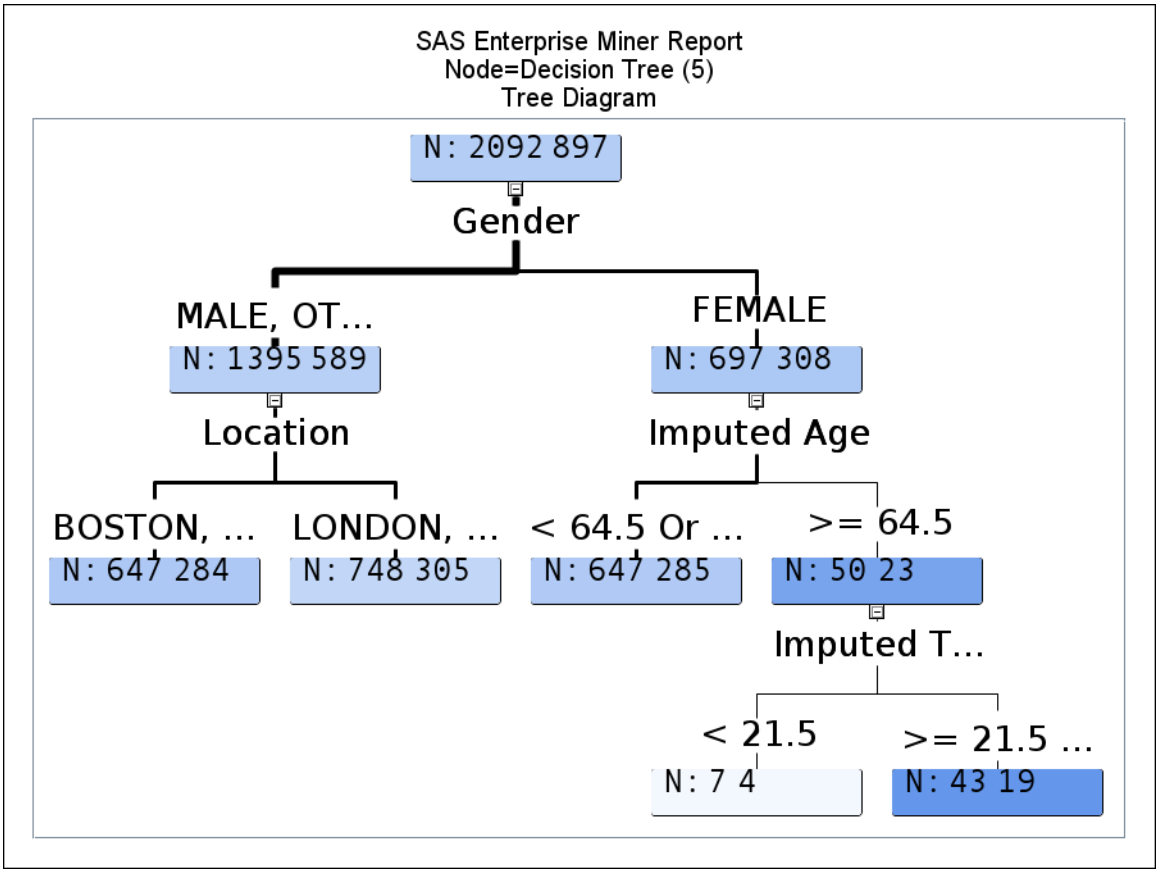
Node=Decision Tree (5)
Model Fit Statistics

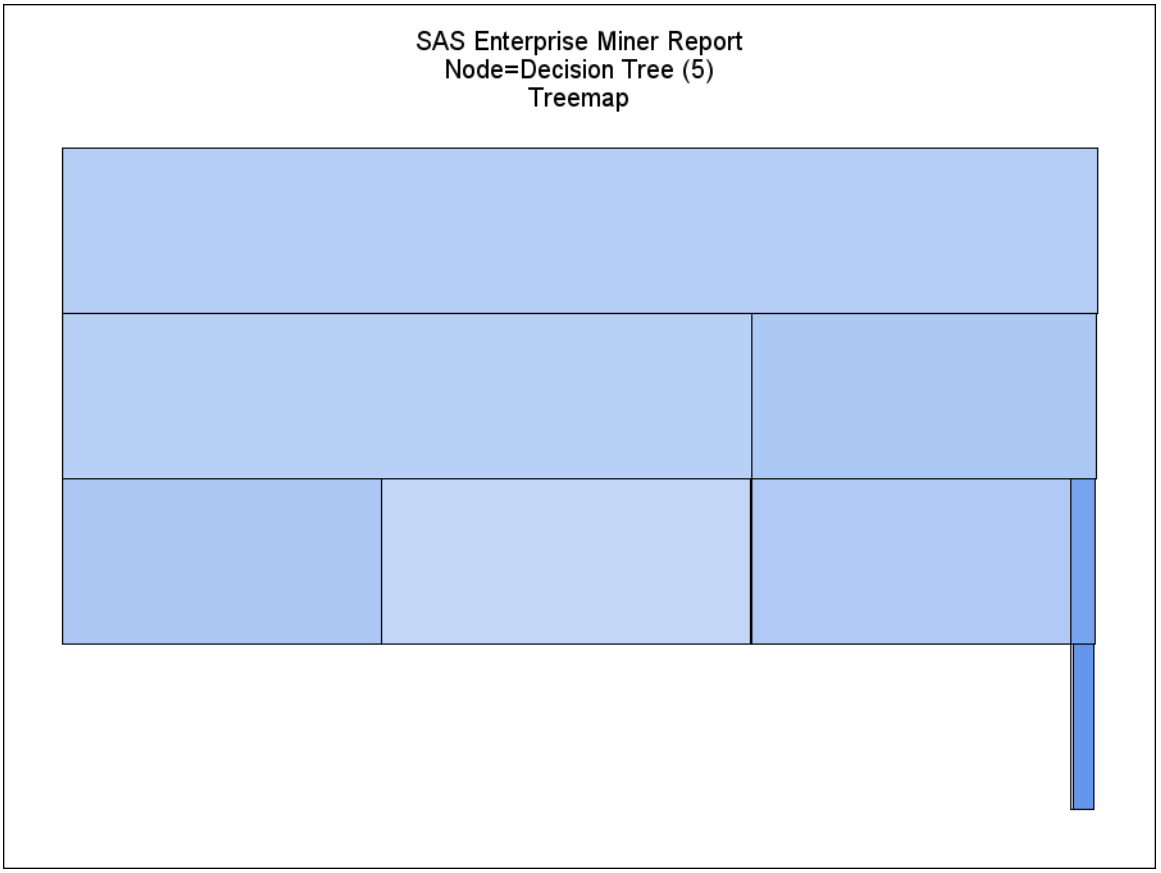
Target=Churn Target Label=' '

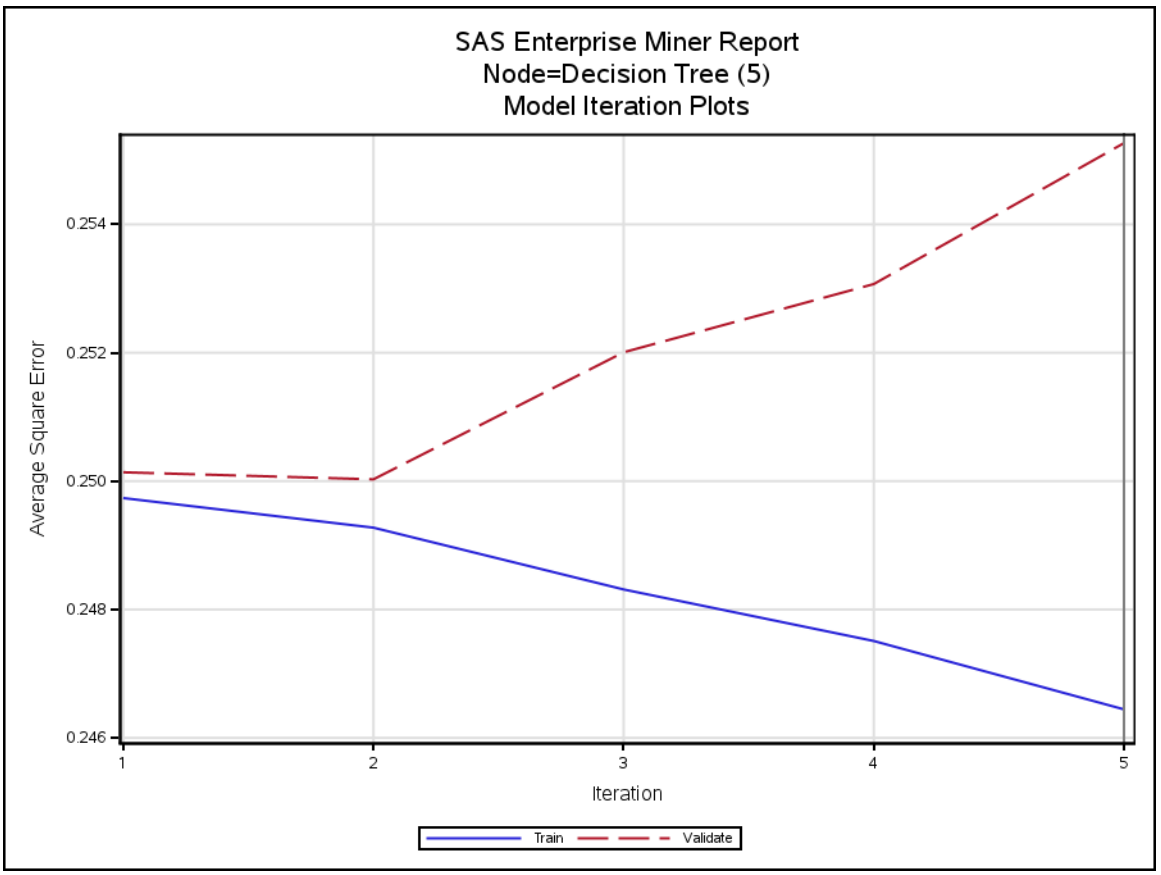
Label of Statistic	Train	Validation	Test
Sum of Frequencies	2092.00	897.000	.
Maximum Absolute Error	0.81	0.814	.
Sum of Squared Errors	515.56	228.974	.
Average Squared Error	0.25	0.255	.
Root Average Squared Error	0.50	0.505	.

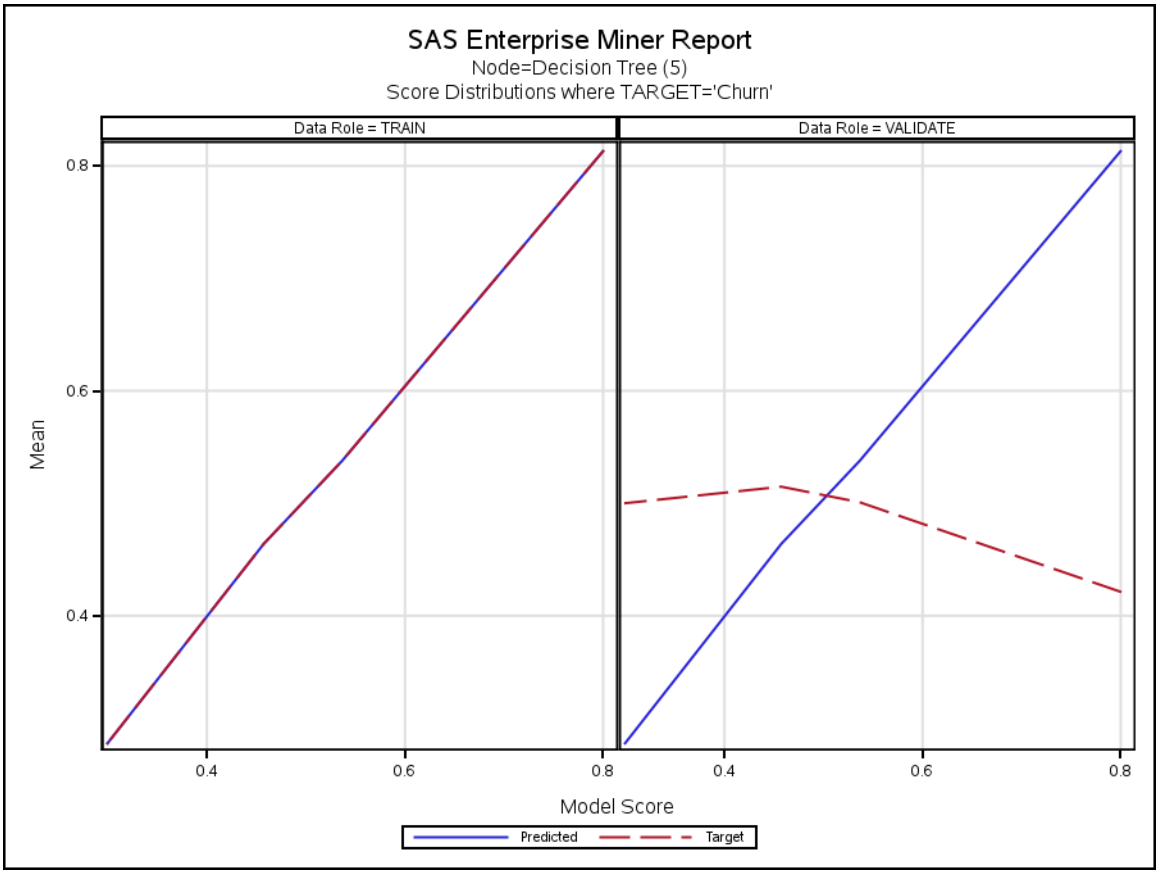
Target=Churn Target Label=''

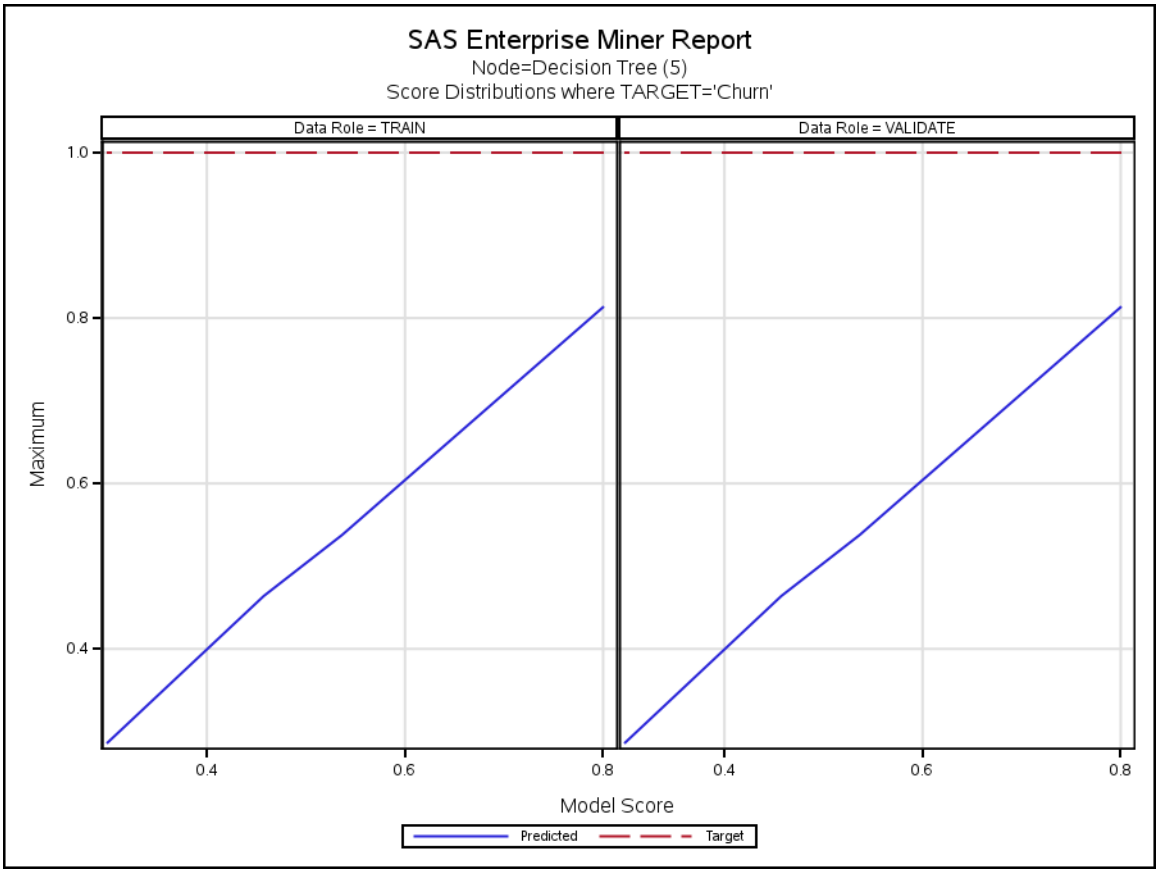
Label of Statistic	Train	Validation	Test
Divisor for ASE	2092.00	897.000	.
Total Degrees of Freedom	2092.00	.	.






SAS Enterprise Miner Report
Node=Decision Tree (5)
Model Iteration Plots
Average Square Error
0.254
0.252
0.250
0.248
0.246
1
2
3
4
5
Iteration
Train
Validate


SAS Enterprise Miner Report
Node=Decision Tree (5)
Score Distributions where TARGET='Churn'
Data Role = TRAIN
Data Role = VALIDATE
Mean
0.8
0.6
0.4
0.4
0.6
0.8
0.4
0.6
0.8
Model Score
Predicted
Target



Node=Decision Tree (5)
Score Distributions

Target Variable=Churn Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.788 - 0.814	0.81395	0.81395	0.81395	0.81395	1	0
0.523 - 0.550	0.53787	0.54405	0.53168	0.53787	1	0
0.444 - 0.471	0.46390	0.46390	0.46390	0.46390	1	0
0.286 - 0.312	0.28571	0.28571	0.28571	0.28571	1	0

Target Variable=Churn Data Role=VALIDATE

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.788 - 0.814	0.81395	0.81395	0.81395	0.42105	1	0
0.523 - 0.550	0.53786	0.54405	0.53168	0.50088	1	0
0.444 - 0.471	0.46390	0.46390	0.46390	0.51475	1	0
0.286 - 0.312	0.28571	0.28571	0.28571	0.50000	1	0

SAS Enterprise Miner Report

Node=Decision Tree (6)
Summary

Node id = Tree8
Node label = Decision Tree (6)
Meta path = Ids => Stat => Impt => Stat2 => Part => Tree8
Notes =

Node=Decision Tree (6)
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 (6)
Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Churn
INPUT	BINARY	2	M_Age M_TotalPurchases
INPUT	INTERVAL	4	IMP_Age IMP_TotalPurchases LastPurchaseDate TotalSpent
INPUT	NOMINAL	5	FavoriteCategory Gender Location MembershipLevel Occupation
ID	INTERVAL	2	CustomerID _dataobs_

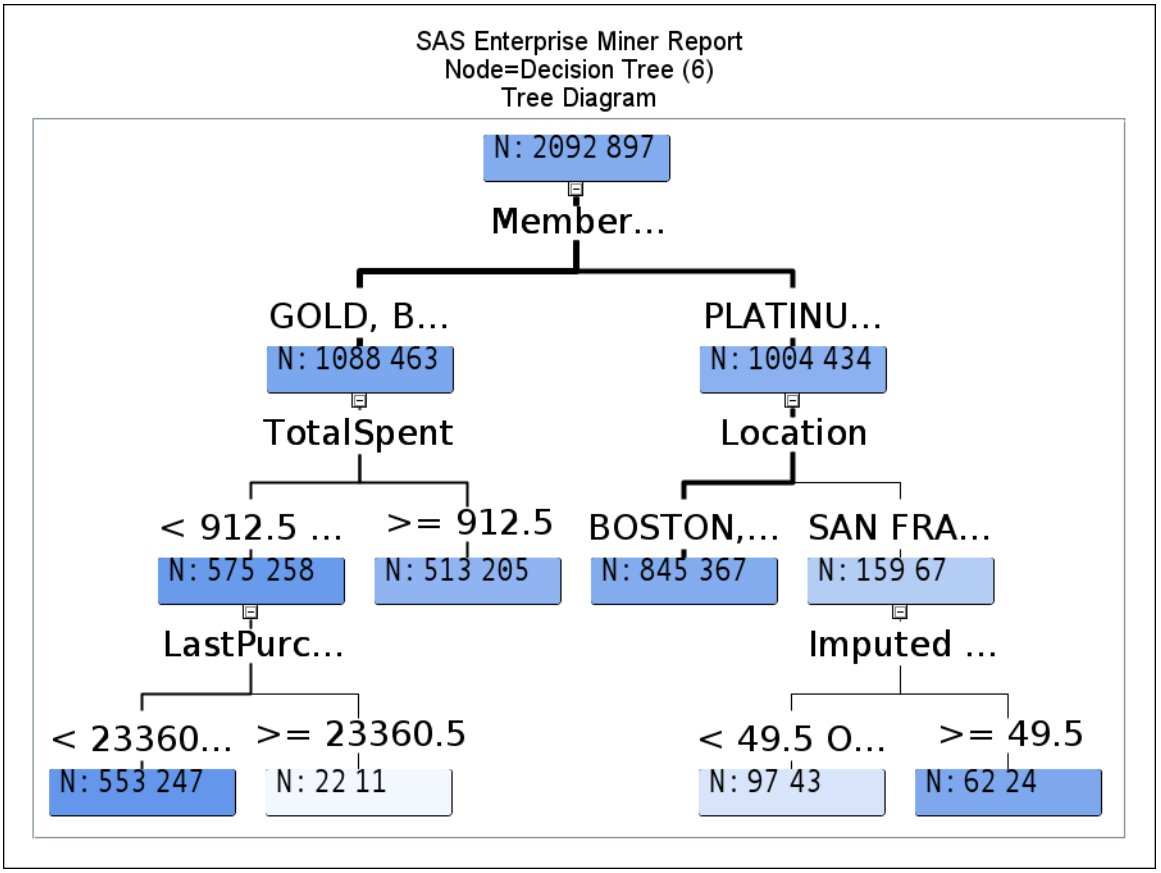
Node=Decision Tree (6)
Model Fit Statistics

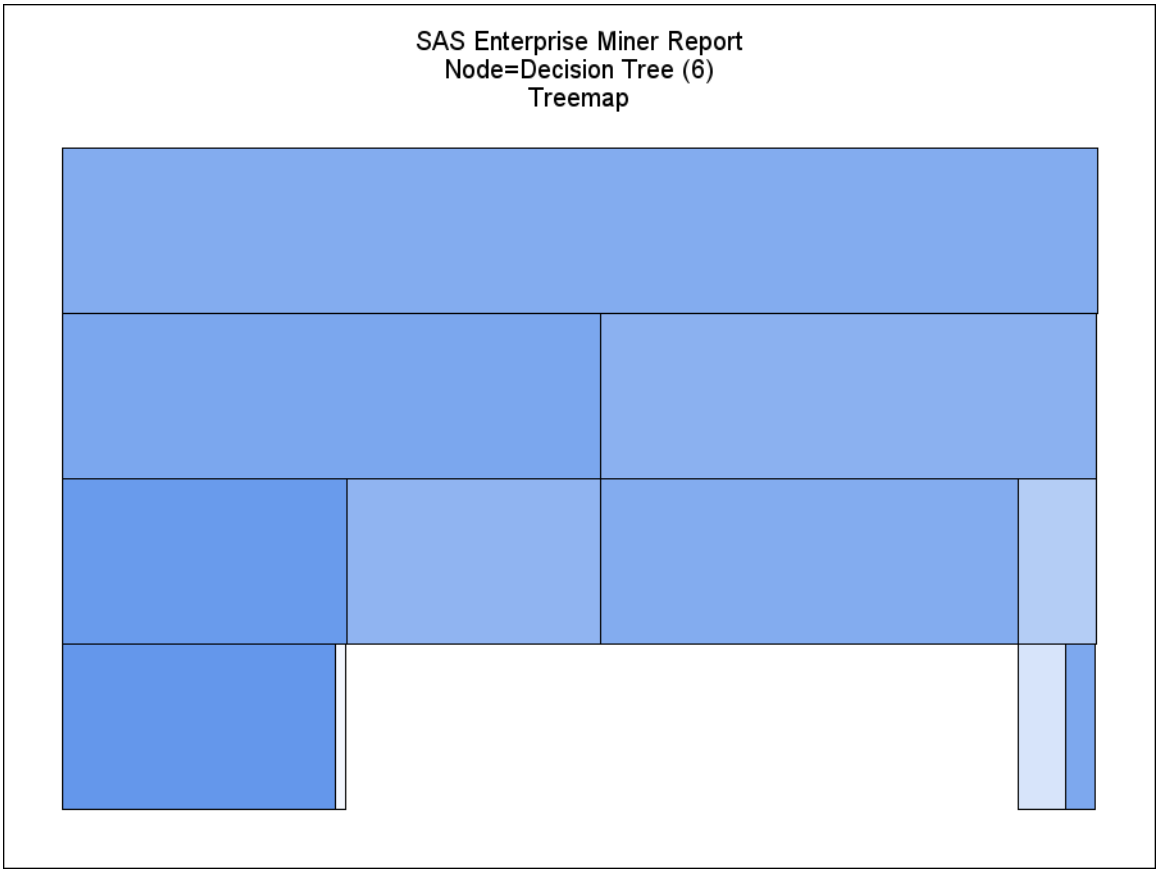
Target=Churn Target Label=''

Label of Statistic	Train	Validation	Test
Sum of Frequencies	2092.00	897.000	.
Maximum Absolute Error	0.77	0.773	.
Sum of Squared Errors	511.88	228.271	.
Average Squared Error	0.24	0.254	.
Root Average Squared Error	0.49	0.504	.

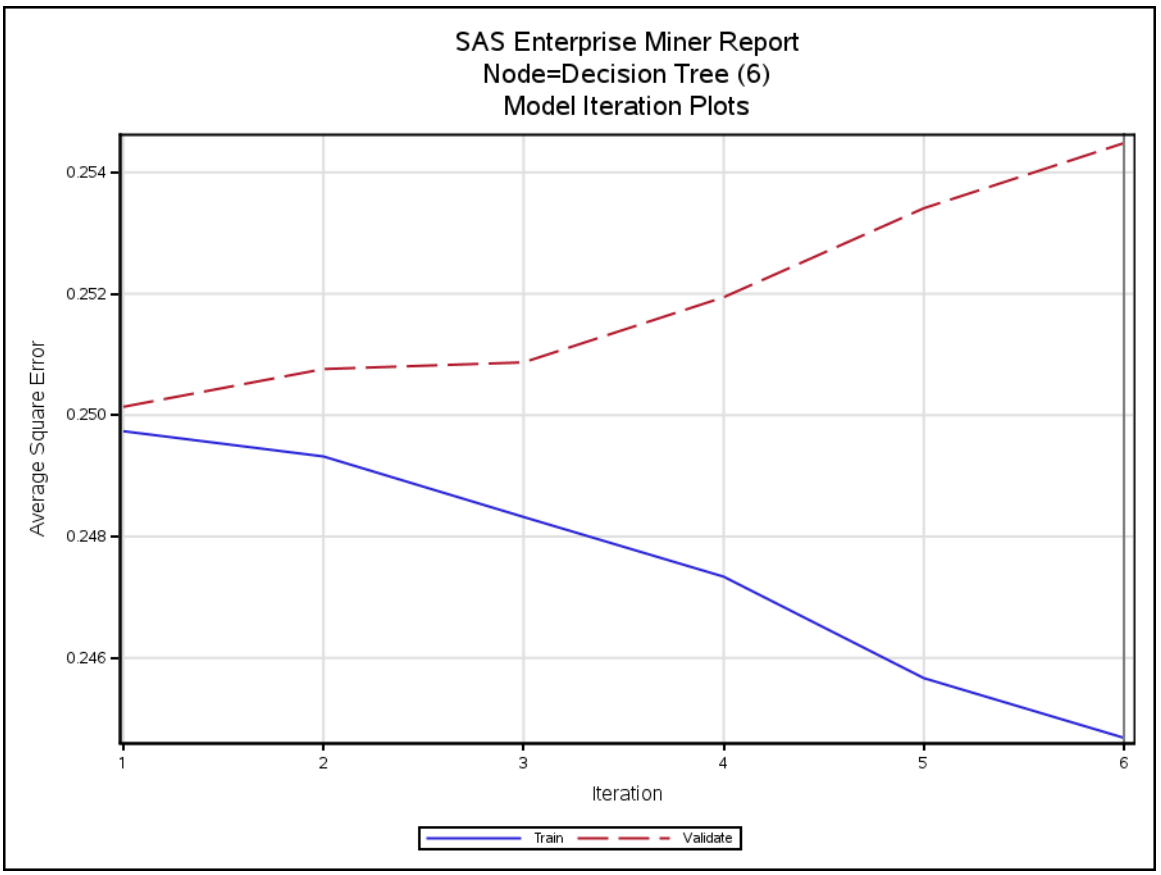
Target=Churn Target Label=''

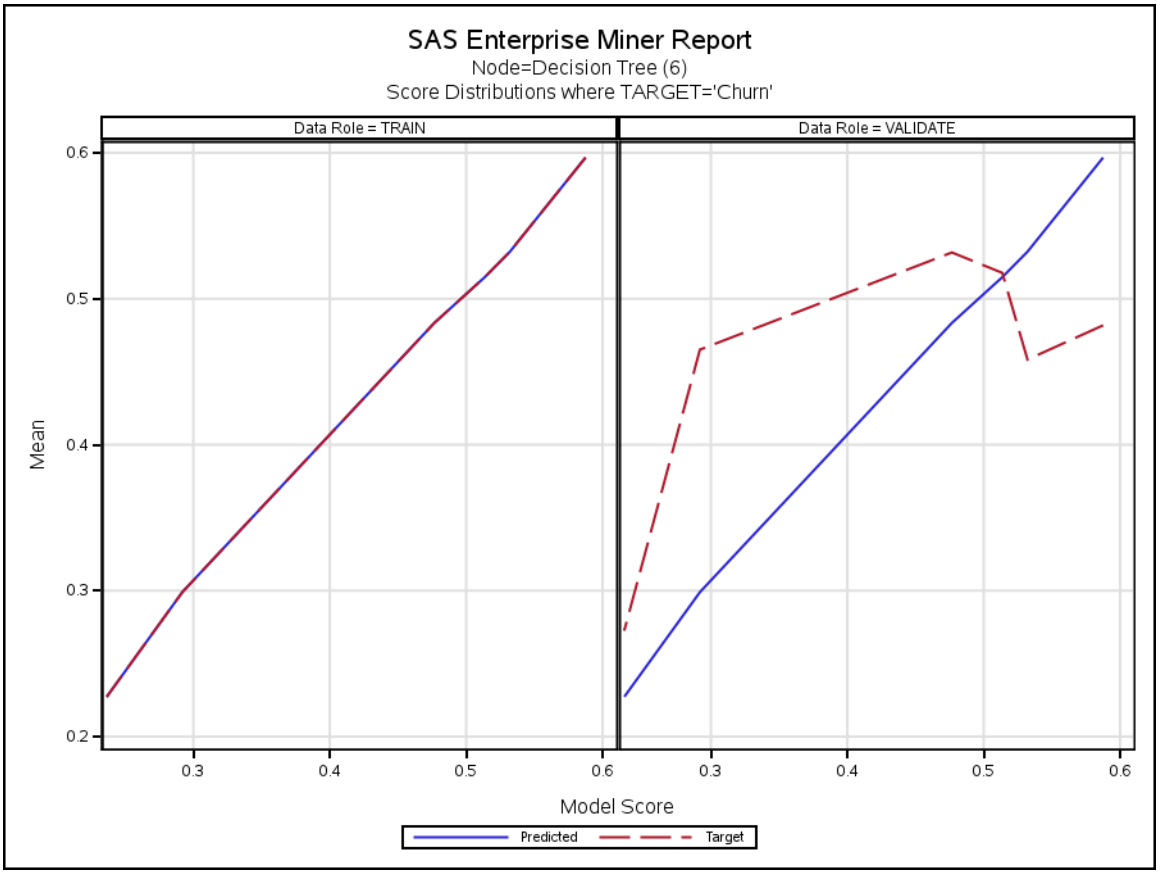
Label of Statistic	Train	Validation	Test
Divisor for ASE	2092.00	897.000	.
Total Degrees of Freedom	2092.00	.	.

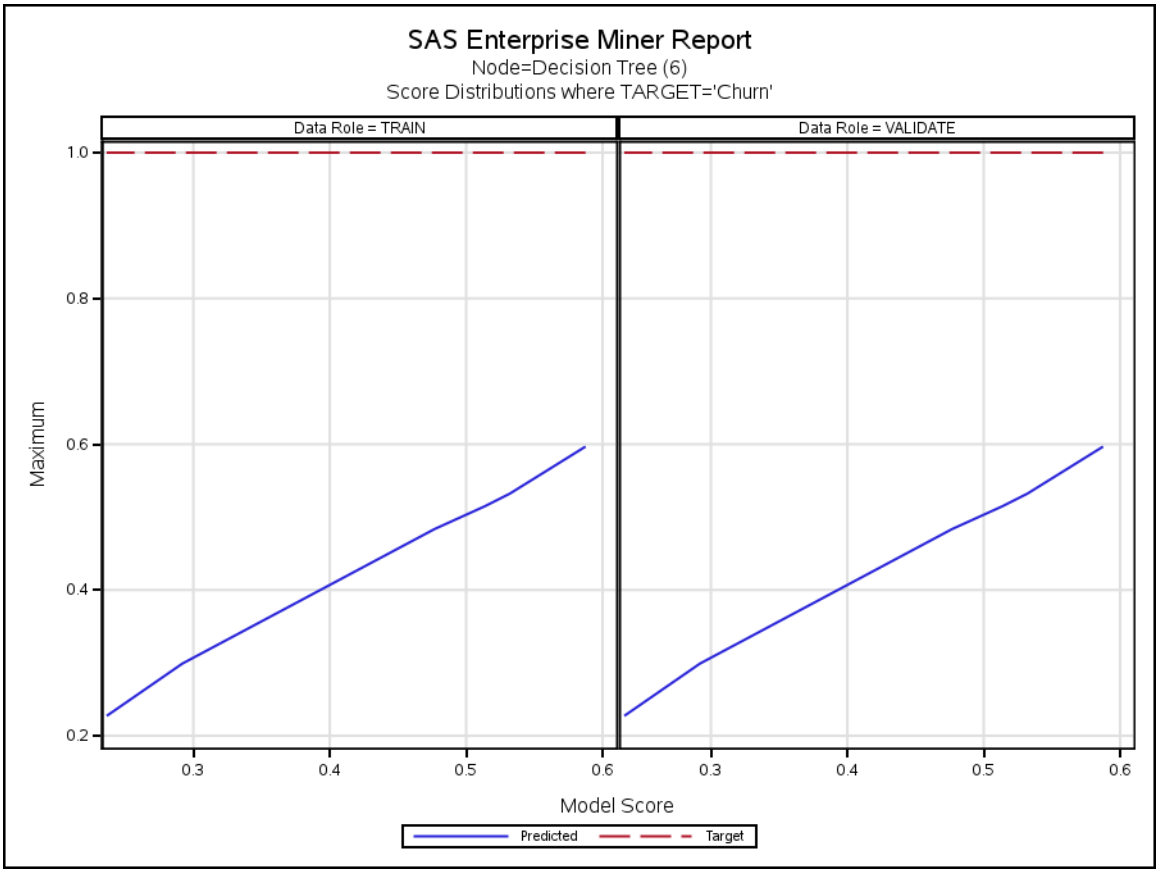




SAS Enterprise Miner Report
Node=Decision Tree (6)
Model Iteration Plots







Node=Decision Tree (6)
Score Distributions

Target Variable=Churn Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.578 - 0.597	0.59675	0.59675	0.59675	0.59675	1	0
0.523 - 0.541	0.53226	0.53226	0.53226	0.53226	1	0
0.504 - 0.523	0.51479	0.51479	0.51479	0.51479	1	0
0.467 - 0.486	0.48343	0.48343	0.48343	0.48343	1	0
0.283 - 0.301	0.29897	0.29897	0.29897	0.29897	1	0
0.227 - 0.246	0.22727	0.22727	0.22727	0.22727	1	0

Target Variable=Churn Data Role=VALIDATE

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
0.578 - 0.597	0.59675	0.59675	0.59675	0.48178	1	0
0.523 - 0.541	0.53226	0.53226	0.53226	0.45833	1	0
0.504 - 0.523	0.51479	0.51479	0.51479	0.51771	1	0
0.467 - 0.486	0.48343	0.48343	0.48343	0.53171	1	0
0.283 - 0.301	0.29897	0.29897	0.29897	0.46512	1	0
0.227 - 0.246	0.22727	0.22727	0.22727	0.27273	1	0

SAS Enterprise Miner Report

Node=Model Comparison Summary

Node id = MdlComp
Node label = Model Comparison
Meta path = Ids => Stat => Impt => Stat2 => Part => Tree5 => MdlComp
Notes =

Node=Model Comparison Properties

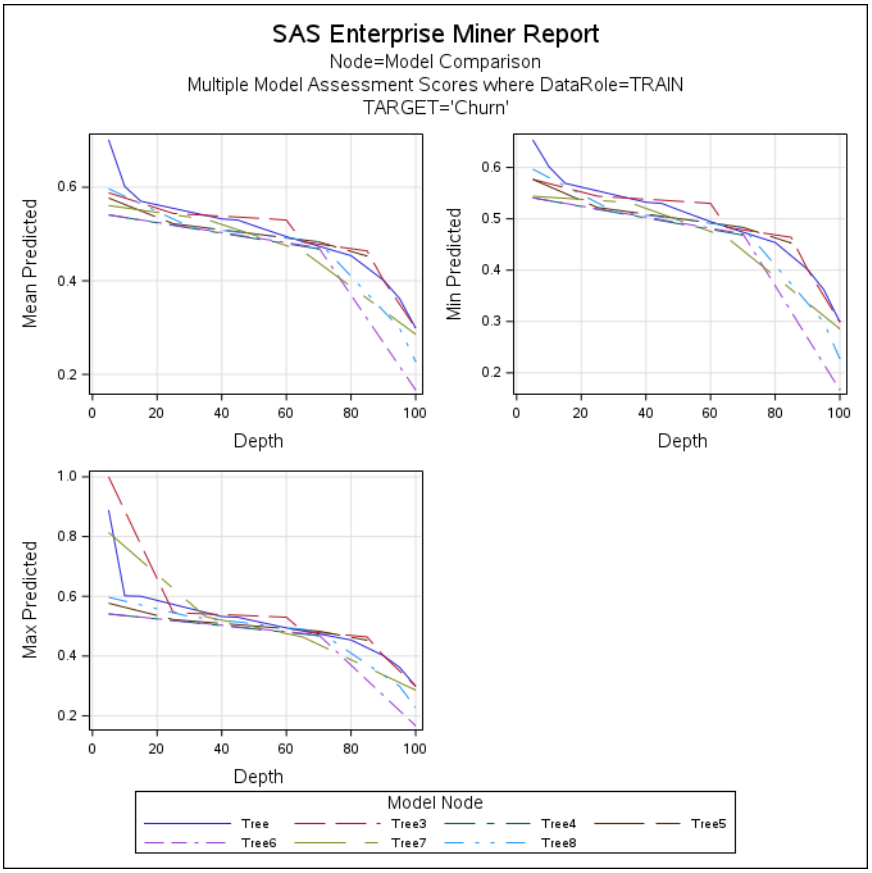
Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	ModelCompare		NumberOfReportedLevels	1E-6		SelectionData	DEFAULT	
AssessAllTargetLevels	N		NumberofBins	20		SelectionDepth	10	
DecileBin	20		ProfitEpsilon	1E-6		SelectionTable	TRAIN	TABLE
HPCriteria	DEFAULT		RecomputeAssess	N		StatisticUsed	_VASE_	
LiftEpsilon	1E-6		RocChart	Y		TargetLabel		
ModelCriteria	Valid: Average Squared Error		RocEpsilon	0.01		TargetName	Churn	
ModelDescription	Decision Tree (3splitsas)		RoiEpsilon	1E-6		classViyaCriteria	DEFAULT	
ModelId	Tree5		ScoreDistBin	20		intervalViyaCriteria	DEFAULT	
NormalizeReportingVariables	Y		SelectionCriteria	DEFAULT				

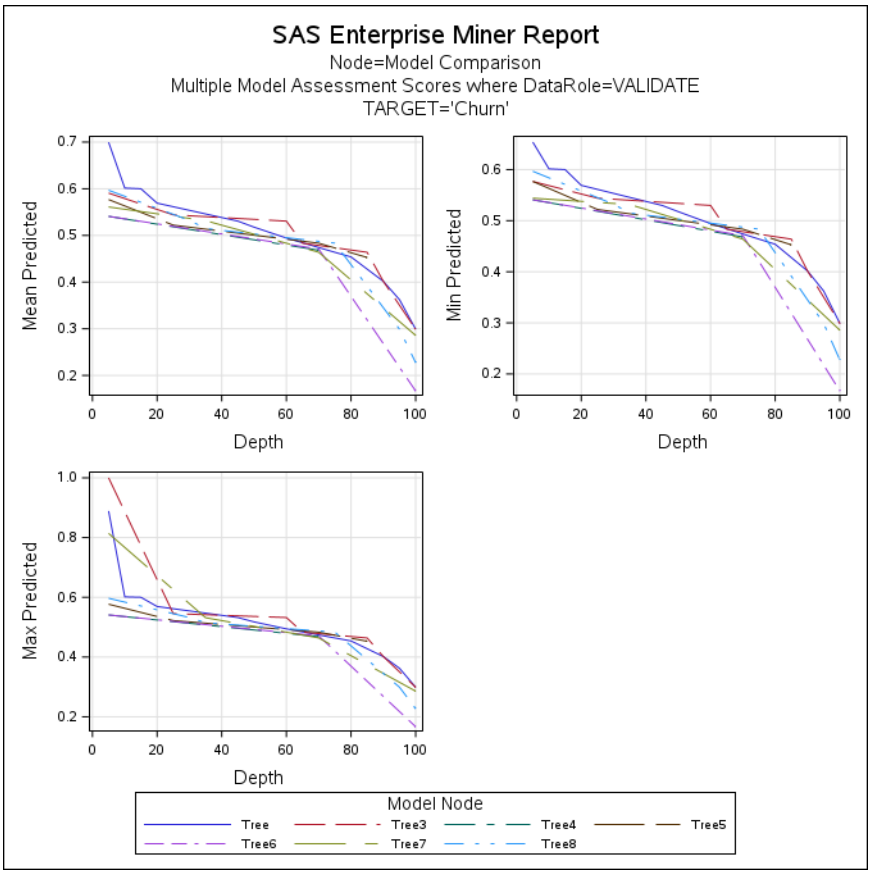
Node=Model Comparison Variable Summary

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	Tree5	Tree5	Decision Tree (3splitsas)	Churn		0.25260	0.24803
	Tree4	Tree4	Decision Tree (2split sas)	Churn		0.25331	0.24856
	Tree6	Tree6	Decision Tree (2_3p)	Churn		0.25335	0.24829
	Tree8	Tree8	Decision Tree (5_4p)	Churn		0.25448	0.24468
	Tree3	Tree3	Decision Tree (saa)	Churn		0.25457	0.24379
	Tree7	Tree7	Decision Tree (3_4p)	Churn		0.25527	0.24644
	Tree	Tree	Decision Tree random	Churn		0.25856	0.24140





End of Report