

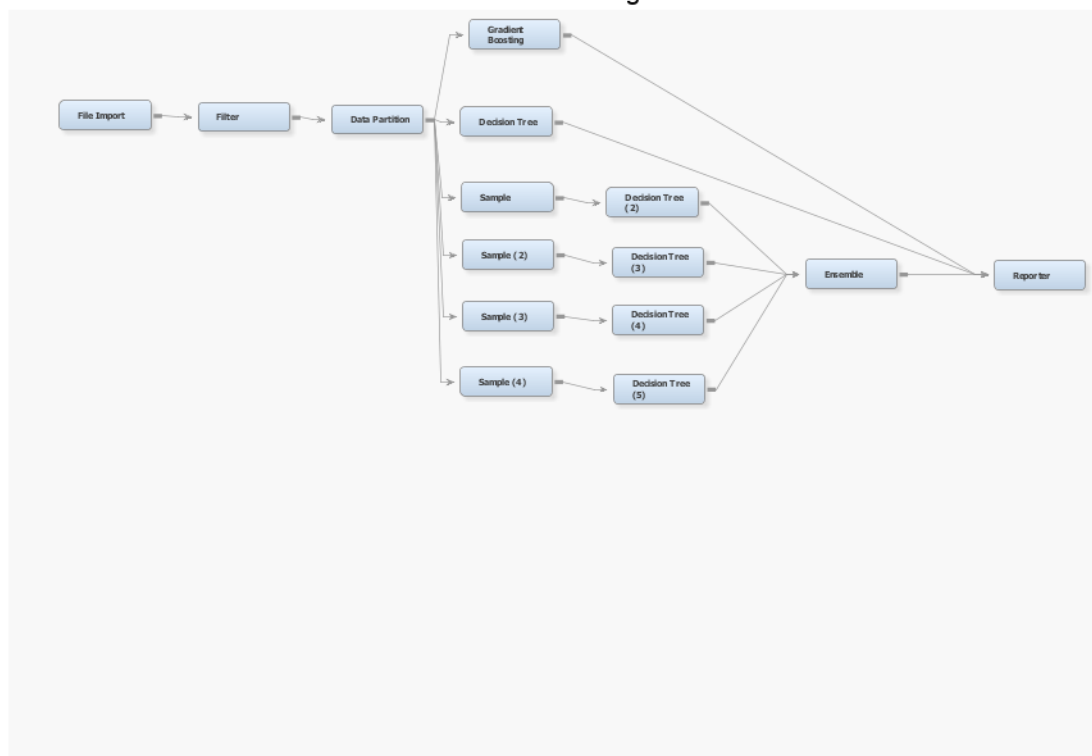
SAS Enterprise Miner Report

User = mac
Date = 14:32:25 January 08
Project = 2
Diagram = 1

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	E:\um sem2\wqd7005\case study\E-commerce Customer Behavior Preparation.xlsx		Password	NoPassword	
AdvancedAdvisor	N		ImportType	Local	LOCAL	Role	TRAIN	
Delimiter	,		MaxCols	10000		SkipRows	0	
FileType	xlsx	XLS	MaxRows	1000000		Summarize	N	

Node=File Import
Data Attributes

Attribute	Value	Attribute	Value	Attribute	Value
Data Name	FIMPORT_DATA	Date Created	07Jan2023:15:40:26	Data Size	66560
Data Type	DATA	Date Modified	07Jan2023:15:40:26	Role	TRAIN
Data Label		Number Rows	348	Segment	
Engine	V9	Number Columns	14	Data Library	EMWS1

Node=File Import
Variables List

Name	Label	Role	Level	Type	Length	Format	Creator
Age	Age	INPUT	INTERVAL	N	8	BEST.	
Average_Rating	Average Rating	INPUT	INTERVAL	N	8	BEST.	
City	City	INPUT	NOMINAL	C	13	\$13.	
Customer_ID	Customer ID	INPUT	INTERVAL	N	8	BEST.	
Days_Since_Last_Purchase	Days Since Last Purchase	INPUT	INTERVAL	N	8	BEST.	
Days_Since_Last_Purchase_copy	Days Since Last Purchase_copy	INPUT	INTERVAL	N	8	BEST.	
Discount_Applied	Discount Applied	INPUT	INTERVAL	N	8	BEST.	
Favorite_Category	Favorite Category	INPUT	NOMINAL	C	15	\$15.	
Gender	Gender	INPUT	NOMINAL	C	6	\$6.	
Items_Purchased	Items Purchased	INPUT	INTERVAL	N	8	BEST.	
Membership_Type	Membership Type	INPUT	NOMINAL	C	6	\$6.	
Satisfaction_Level	Satisfaction Level	INPUT	NOMINAL	C	11	\$11.	
Total_Spend	Total Spend	TARGET	INTERVAL	N	8	BEST.	
churn	churn	INPUT	INTERVAL	N	8	BEST.	

Node=File Import
Created Variables List

SAS Enterprise Miner Report

Node=Filter Summary

Node id = Filter
Node label = Filter
Meta path = FIMPORT => Filter
Notes =

Node=Filter Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	Filter		KeepMissingInterval	Y		PercentsCutoff	0.5	
ClassFilterMethod	MINPCT		MADSCutoff	9		PublishScoreCode	Y	
CreateDistributionData	Y	N	MaxValues	25		SpacingsCutoff	9	
ExportTable	FILTERED		MinFreq	1		StddevCutoff	3	
IntervalFilterMethod	STDDEV		MinPercent	0.01		TabletoFilter	TRAIN	
KeepMissingClass	Y		NormalizeClassValue	Y		UpdateClassLevel	N	

Node=Filter Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Total_Spend
INPUT	INTERVAL	8	Age Average_Rating Customer_ID Days_Since_Last_Purchase Days_Since_Last_Purchase_copy Discount_Applied Items_Purchased churn
INPUT	NOMINAL	5	City Favorite_Category Gender Membership_Type Satisfaction_Level

Node=Filter Excluded Class Values

Variable	Role	Level	Train Count	Train Percent	Label	Filter Method
Favorite_Category	INPUT	HEALTH & BEAUTY	1	0.28736	Favorite Category	MINPCT

Node=Filter Limits for Interval Variables

Variable	Role	Minimum	Maximum	Filter Method	Keep Missing Values	Label
Age	INPUT	18.9435	48.212	STDDEV	Y	Age
Average_Rating	INPUT	2.2861	5.761	STDDEV	Y	Average Rating
Customer_ID	INPUT	-28.0259	579.802	STDDEV	Y	Customer ID
Days_Since_Last_Purchase	INPUT	-13.8093	67.039	STDDEV	Y	Days Since Last Purchase
Days_Since_Last_Purchase_copy	INPUT	-13.8093	67.039	STDDEV	Y	Days Since Last Purchase_copy
Discount_Applied	INPUT	-0.9993	2.005	STDDEV	Y	Discount Applied
Items_Purchased	INPUT	0.1939	25.070	STDDEV	Y	Items Purchased
churn	INPUT	-1.0818	1.806	STDDEV	Y	churn

SAS Enterprise Miner Report

Node=Data Partition Summary

Node id = Part
Node label = Data Partition
Meta path = FIMPORT => Filter => 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	INTERVAL	1	Total_Spend
INPUT	INTERVAL	8	Age Average_Rating Customer_ID Days_Since_Last_Purchase Days_Since_Last_Purchase_copy Discount_Applied Items_Purchased churn
INPUT	NOMINAL	5	City Favorite_Category Gender Membership_Type Satisfaction_Level

SAS Enterprise Miner Report

Node=Sample (4)
Summary

Node id = Smpl4
Node label = Sample (4)
Meta path = FIMPORT => Filter => Part => Smpl4
Notes =

Node=Sample (4)
Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	Sample		IgnoreSmallStrata	N		OutputType	DATA	
AdjustFreq	N		IntervalDistribution	Y		Pvalue	0.01	
Alpha	0.01		LevelProportion	100		RandomSeed	12345	
ClassDistribution	Y		LevelSampleProportion	50		SizeObs	.	
ClusterMethod	RANDOM		LevelSelection	EVENT		SizePercent	70	10
FreqCount	N		Method	DEFAULT		SizeType	PERCENT	
FreqMiss	N		MinStrataSize	5		StratifyCriterion	PROPORTIONAL	

Node=Sample (4)
Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Total_Spend
INPUT	INTERVAL	8	Age Average_Rating Customer_ID Days_Since_Last_Purchase Days_Since_Last_Purchase_copy Discount_Applied Items_Purchased churn
INPUT	NOMINAL	5	City Favorite_Category Gender Membership_Type Satisfaction_Level
ID	INTERVAL	1	_dataobs_

SAS Enterprise Miner Report

Node=Sample (3)
Summary

Node id = Smpl3
Node label = Sample (3)
Meta path = FIMPORT => Filter => Part => Smpl3
Notes =

Node=Sample (3)
Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	Sample		IgnoreSmallStrata	N		OutputType	DATA	
AdjustFreq	N		IntervalDistribution	Y		Pvalue	0.01	
Alpha	0.01		LevelProportion	100		RandomSeed	12345	
ClassDistribution	Y		LevelSampleProportion	50		SizeObs	.	
ClusterMethod	RANDOM		LevelSelection	EVENT		SizePercent	70	10
FreqCount	N		Method	DEFAULT		SizeType	PERCENT	
FreqMiss	N		MinStrataSize	5		StratifyCriterion	PROPORTIONAL	

Node=Sample (3)
Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Total_Spend
INPUT	INTERVAL	8	Age Average_Rating Customer_ID Days_Since_Last_Purchase Days_Since_Last_Purchase_copy Discount_Applied Items_Purchased churn
INPUT	NOMINAL	5	City Favorite_Category Gender Membership_Type Satisfaction_Level
ID	INTERVAL	1	_dataobs_

SAS Enterprise Miner Report

Node=Sample (2)
Summary

Node id = Smpl2
Node label = Sample (2)
Meta path = FIMPORT => Filter => Part => Smpl2
Notes =

Node=Sample (2)
Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	Sample		IgnoreSmallStrata	N		OutputType	DATA	
AdjustFreq	N		IntervalDistribution	Y		Pvalue	0.01	
Alpha	0.01		LevelProportion	100		RandomSeed	12345	
ClassDistribution	Y		LevelSampleProportion	50		SizeObs	.	
ClusterMethod	RANDOM		LevelSelection	EVENT		SizePercent	70	10
FreqCount	N		Method	DEFAULT		SizeType	PERCENT	
FreqMiss	N		MinStrataSize	5		StratifyCriterion	PROPORTIONAL	

Node=Sample (2)
Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Total_Spend
INPUT	INTERVAL	8	Age Average_Rating Customer_ID Days_Since_Last_Purchase Days_Since_Last_Purchase_copy Discount_Applied Items_Purchased churn
INPUT	NOMINAL	5	City Favorite_Category Gender Membership_Type Satisfaction_Level
ID	INTERVAL	1	_dataobs_

SAS Enterprise Miner Report

Node=Sample
Summary

Node id = Smpl
Node label = Sample
Meta path = FIMPORT => Filter => Part => Smpl
Notes =

Node=Sample
Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	Sample		IgnoreSmallStrata	N		OutputType	DATA	
AdjustFreq	N		IntervalDistribution	Y		Pvalue	0.01	
Alpha	0.01		LevelProportion	100		RandomSeed	12345	
ClassDistribution	Y		LevelSampleProportion	50		SizeObs	.	
ClusterMethod	RANDOM		LevelSelection	EVENT		SizePercent	70	10
FreqCount	N		Method	DEFAULT		SizeType	PERCENT	
FreqMiss	N		MinStrataSize	5		StratifyCriterion	PROPORTIONAL	

Node=Sample
Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Total_Spend
INPUT	INTERVAL	8	Age Average_Rating Customer_ID Days_Since_Last_Purchase Days_Since_Last_Purchase_copy Discount_Applied Items_Purchased churn
INPUT	NOMINAL	5	City Favorite_Category Gender Membership_Type Satisfaction_Level
ID	INTERVAL	1	_dataobs_

SAS Enterprise Miner Report

Node=Decision Tree (5)
Summary

Node id = Tree5
Node label = Decision Tree (5)
Meta path = FIMPORT => Filter => Part => Smpl4 => Tree5
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	
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	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

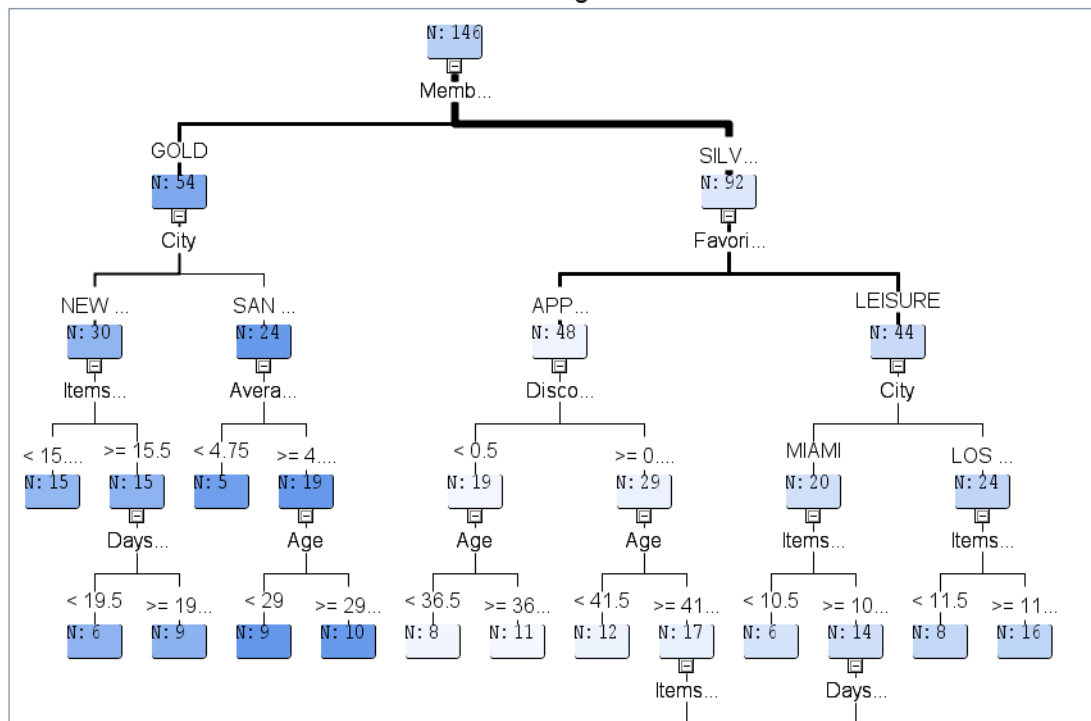
Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Total_Spend
INPUT	INTERVAL	8	Age Average_Rating Customer_ID Days_Since_Last_Purchase Days_Since_Last_Purchase_copy Discount_Applied Items_Purchased churn
INPUT	NOMINAL	5	City Favorite_Category Gender Membership_Type Satisfaction_Level
ID	INTERVAL	1	_dataobs_

Node=Decision Tree (5)
Model Fit Statistics

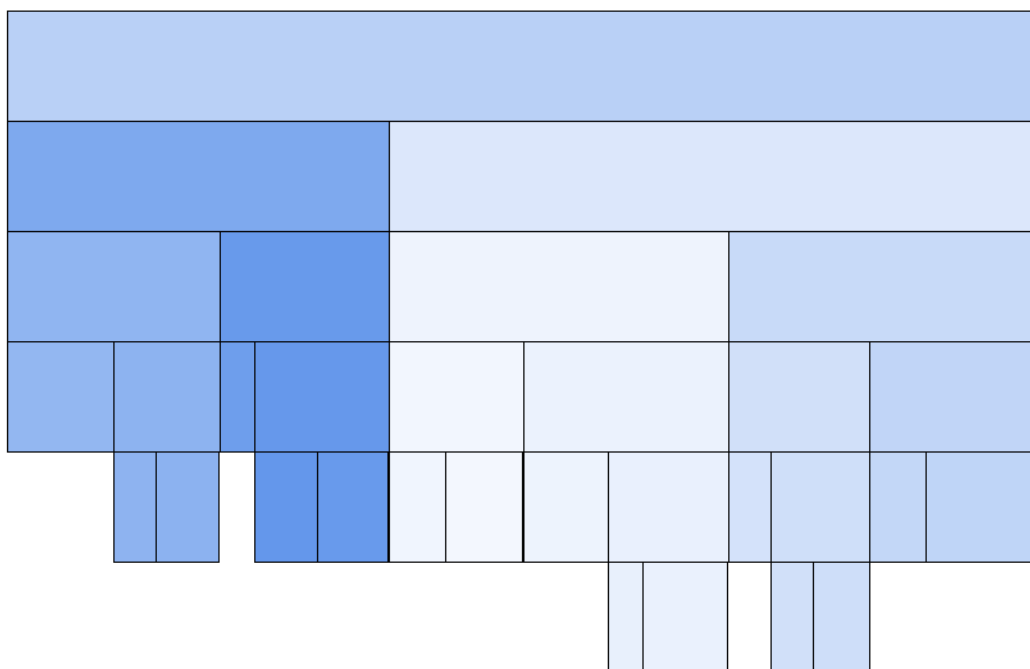
Target=Total_Spend Target Label=Total Spend

Label of Statistic	Train	Validation	Test
Sum of Frequencies	146.00	.	.
Maximum Absolute Error	46.24	.	.
Sum of Squared Errors	14313.04	.	.
Average Squared Error	98.03	.	.
Root Average Squared Error	9.90	.	.
Divisor for ASE	146.00	.	.
Total Degrees of Freedom	146.00	.	.

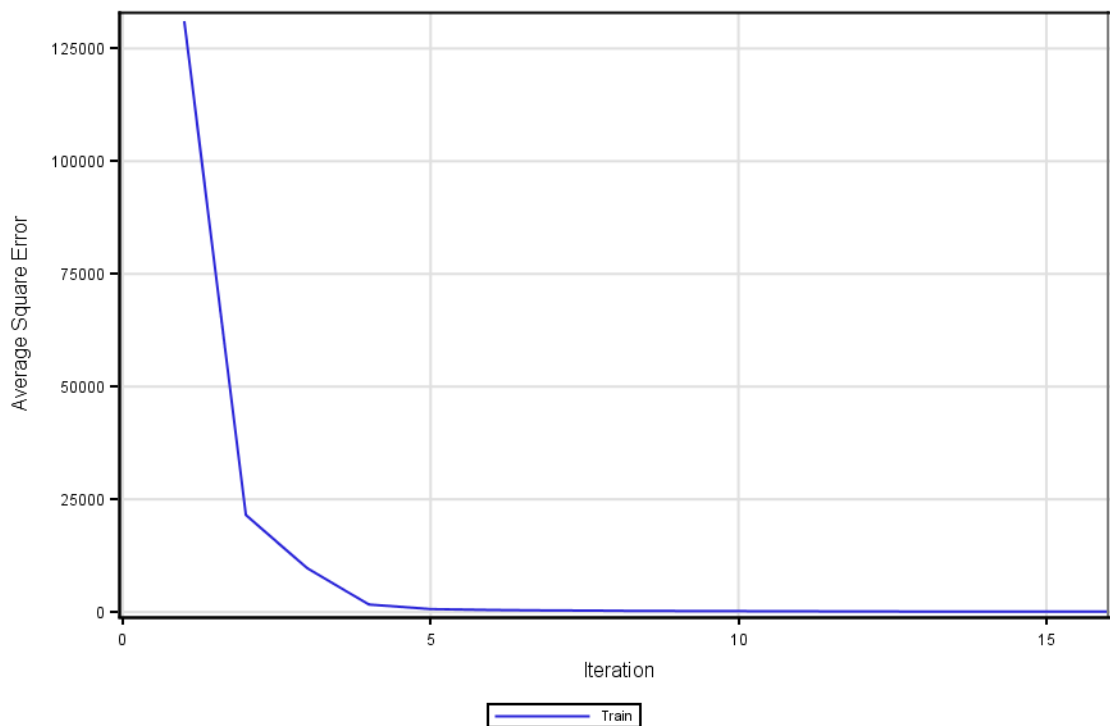
SAS Enterprise Miner Report
Node=Decision Tree (5)
Tree Diagram

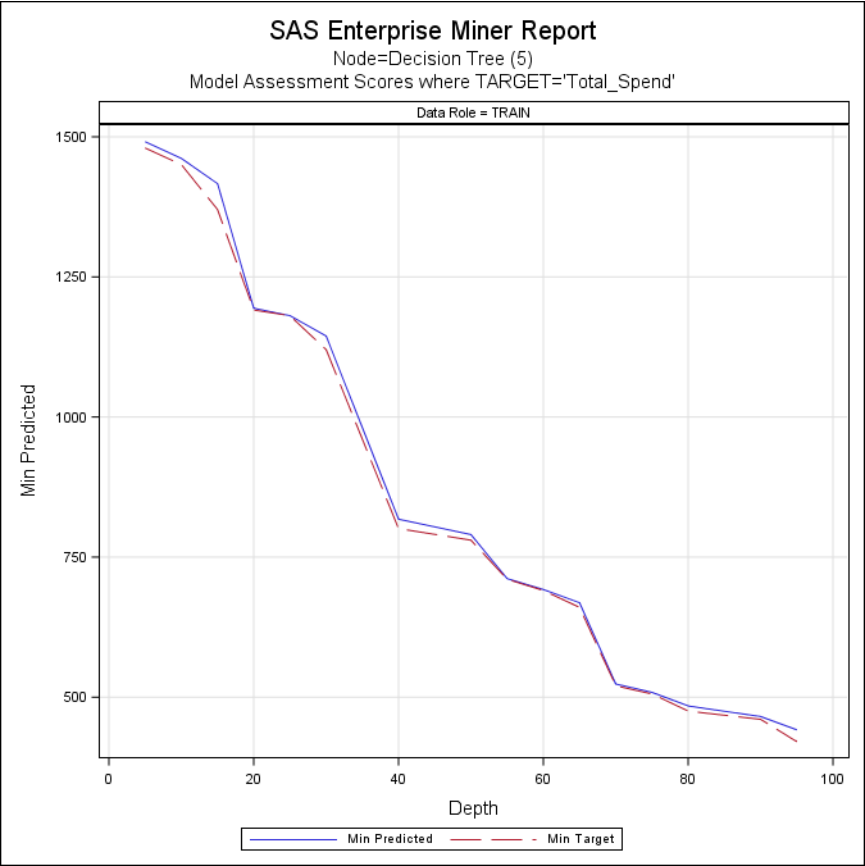
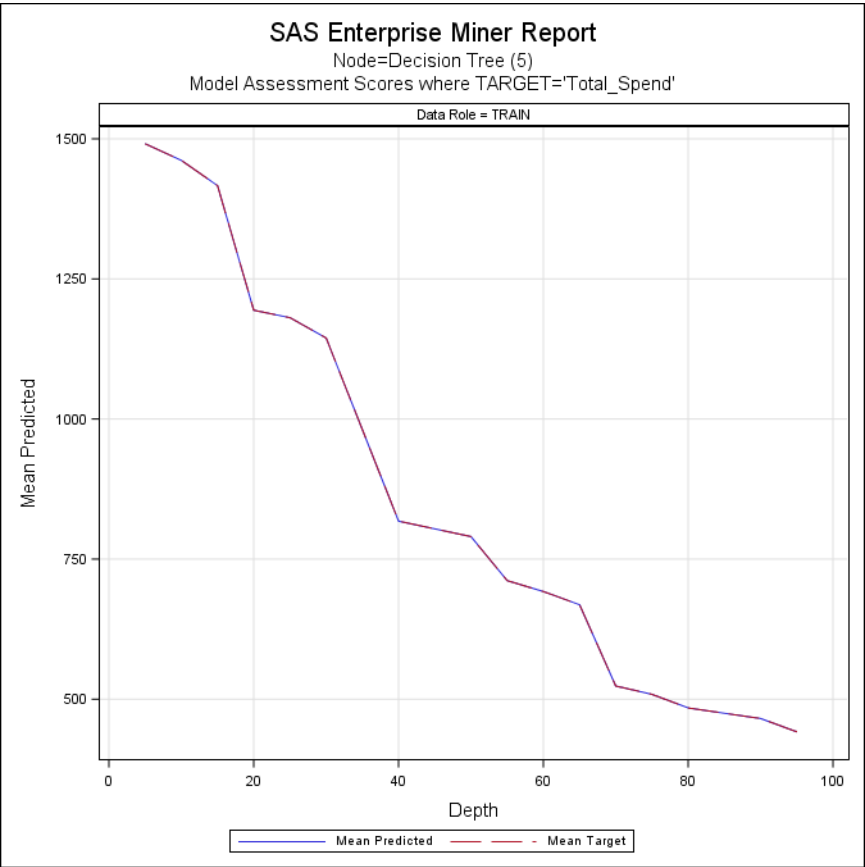


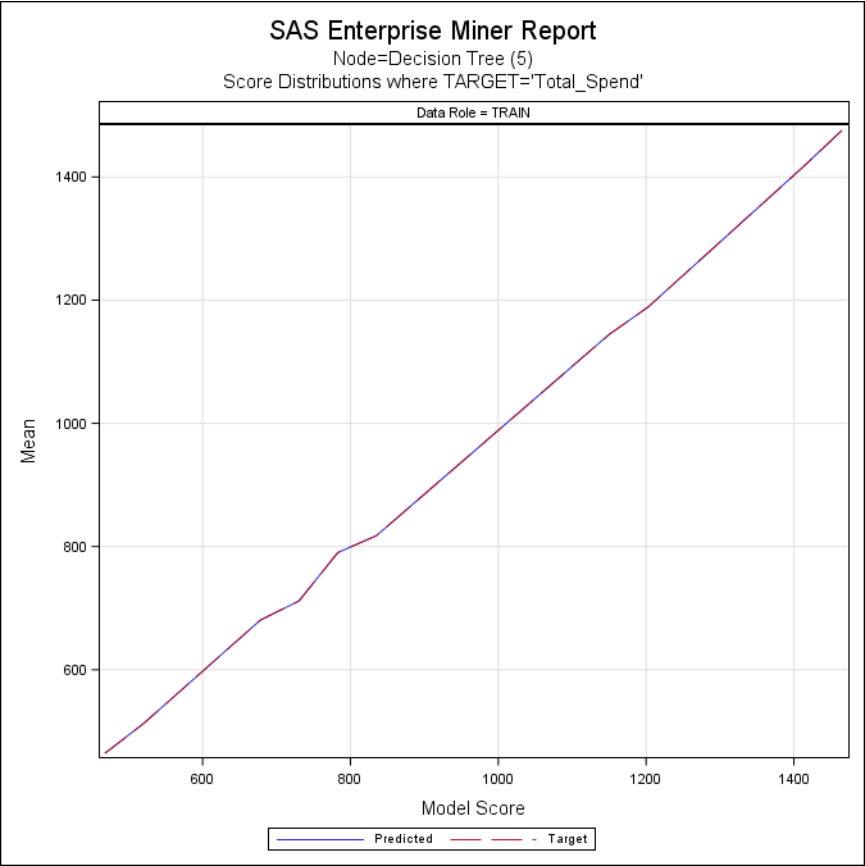
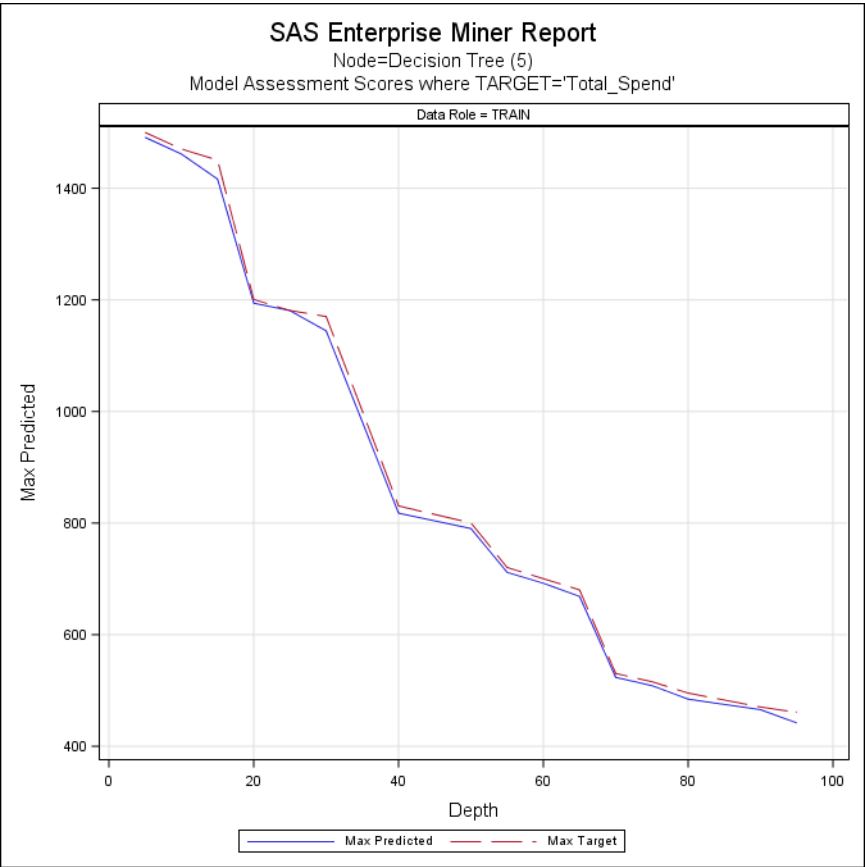
SAS Enterprise Miner Report
Node=Decision Tree (5)
Treemap

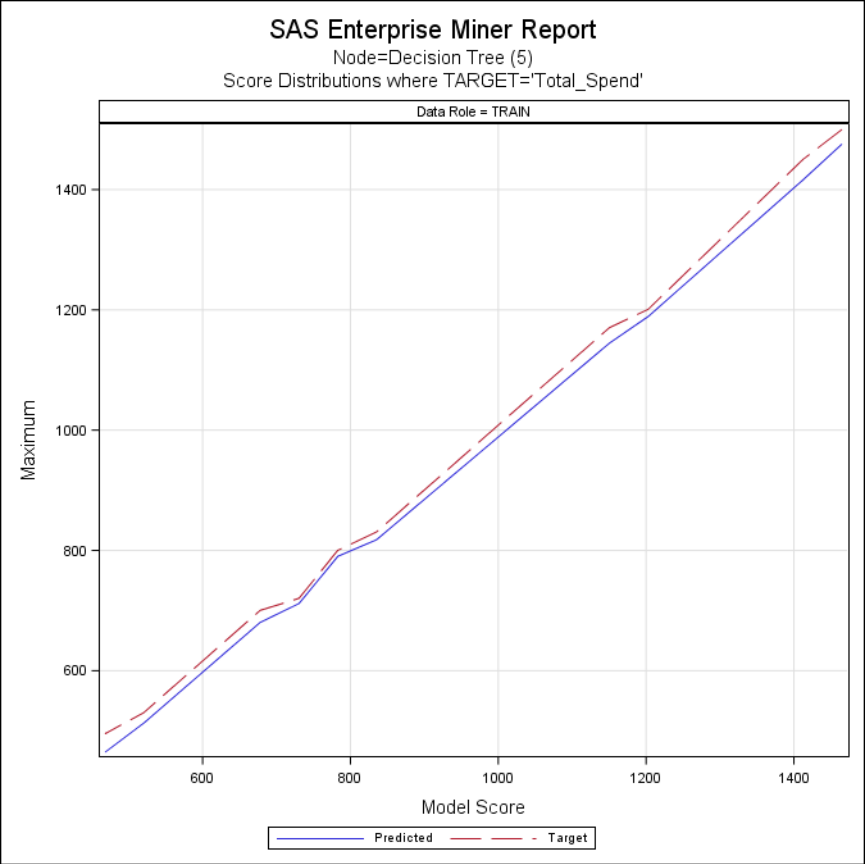


SAS Enterprise Miner Report
Node=Decision Tree (5)
Model Iteration Plots









Node=Decision Tree (5)
Score Distributions

Target Variable=Total_Spend Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
1438.739 - 1491.211	1475.57	1491.21	1461.50	1475.57	1500.10	1450.50
1386.267 - 1438.739	1416.44	1416.44	1416.44	1416.44	1450.50	1370.20
1176.380 - 1228.852	1188.80	1194.13	1180.80	1188.80	1200.80	1180.80
1123.908 - 1176.380	1144.51	1144.51	1144.51	1144.51	1170.30	1120.20
809.076 - 861.548	817.76	817.76	817.76	817.76	830.75	800.90
756.604 - 809.076	790.20	790.20	790.20	790.20	800.20	780.20
704.132 - 756.604	711.65	711.65	711.65	711.65	720.40	710.40
651.660 - 704.132	680.41	692.18	668.63	680.41	700.40	660.30
494.245 - 546.717	513.02	523.47	508.67	513.02	530.40	505.75
441.773 - 494.245	464.40	484.42	441.77	464.40	495.25	420.80

SAS Enterprise Miner Report

Node=Decision Tree (4) Summary

Node id = Tree4
 Node label = Decision Tree (4)
 Meta path = FIMPORT => Filter => Part => Smpl3 => Tree4
 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	
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	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

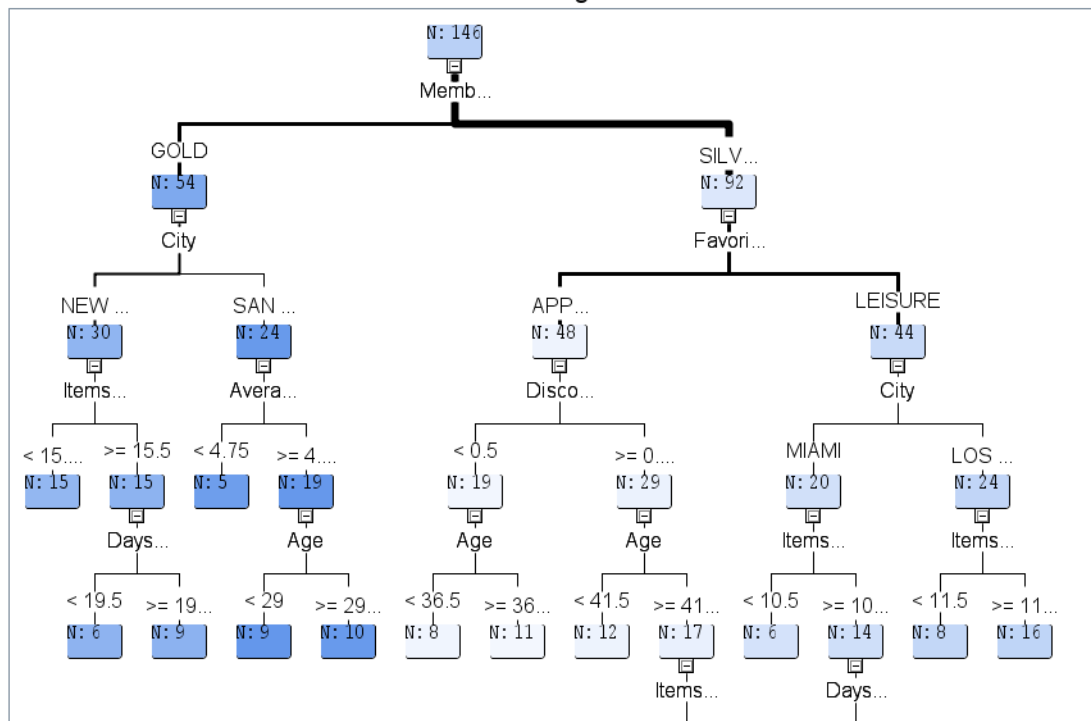
Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Total_Spend
INPUT	INTERVAL	8	Age Average_Rating Customer_ID Days_Since_Last_Purchase Days_Since_Last_Purchase_copy Discount_Applied Items_Purchased churn
INPUT	NOMINAL	5	City Favorite_Category Gender Membership_Type Satisfaction_Level
ID	INTERVAL	1	_dataobs_

Node=Decision Tree (4) Model Fit Statistics

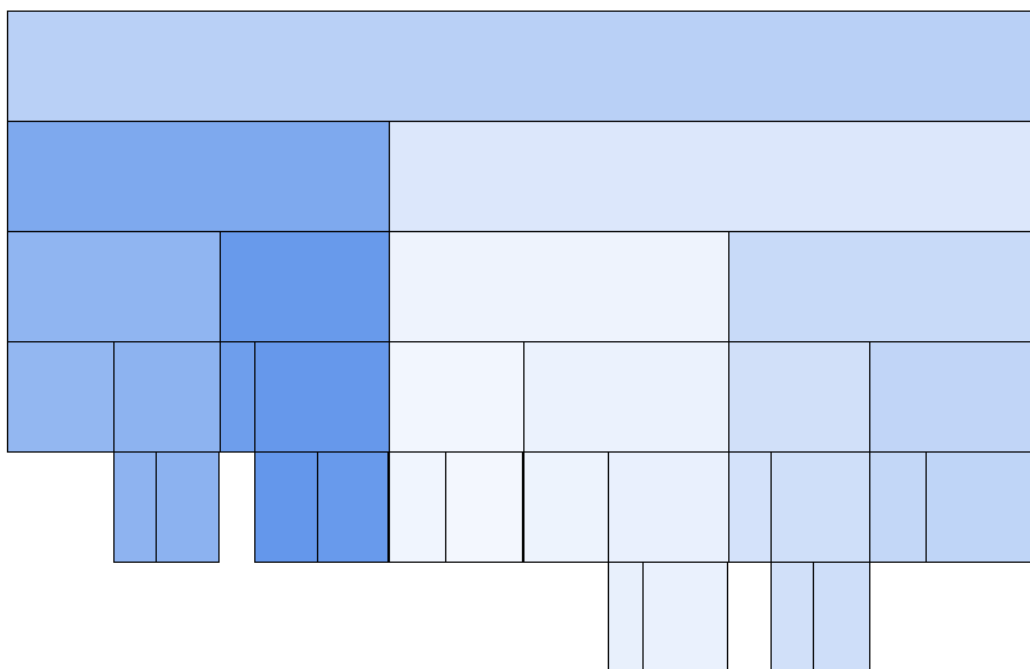
Target=Total_Spend Target Label=Total Spend

Label of Statistic	Train	Validation	Test
Sum of Frequencies	146.00	.	.
Maximum Absolute Error	46.24	.	.
Sum of Squared Errors	14313.04	.	.
Average Squared Error	98.03	.	.
Root Average Squared Error	9.90	.	.
Divisor for ASE	146.00	.	.
Total Degrees of Freedom	146.00	.	.

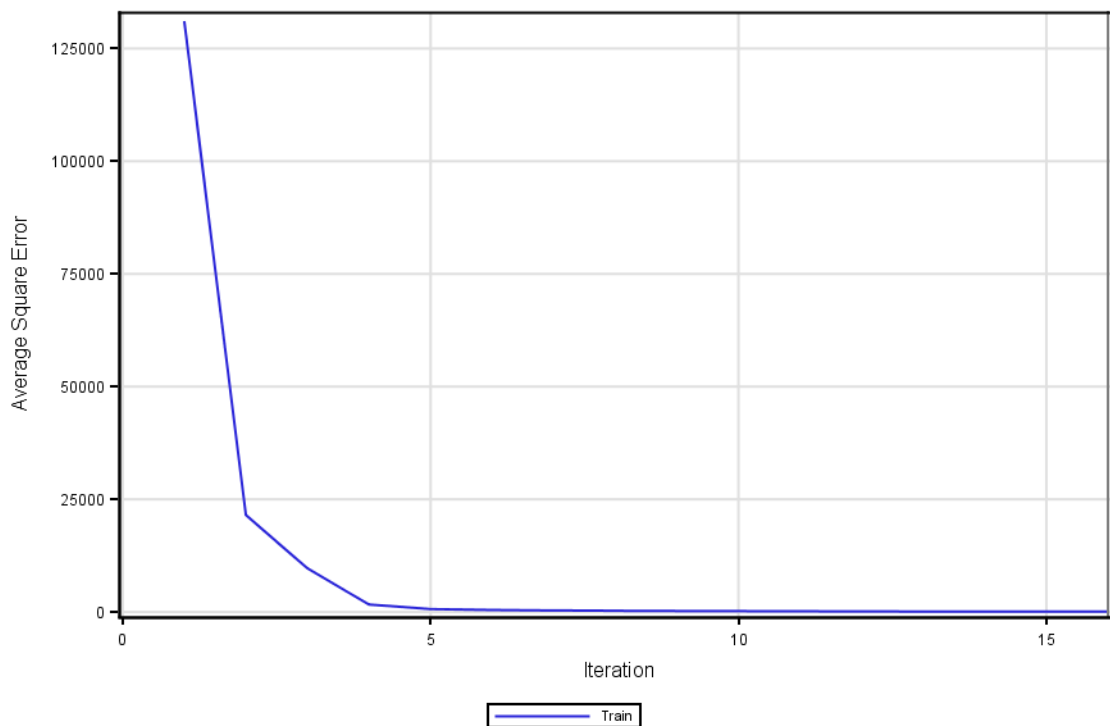
SAS Enterprise Miner Report
Node=Decision Tree (4)
Tree Diagram

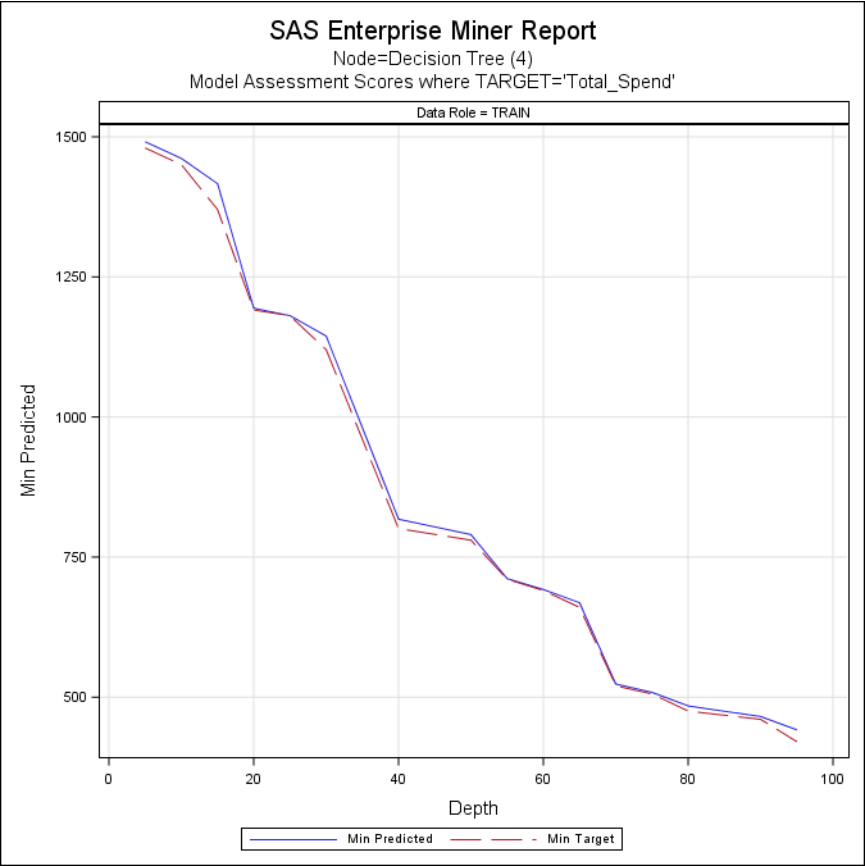
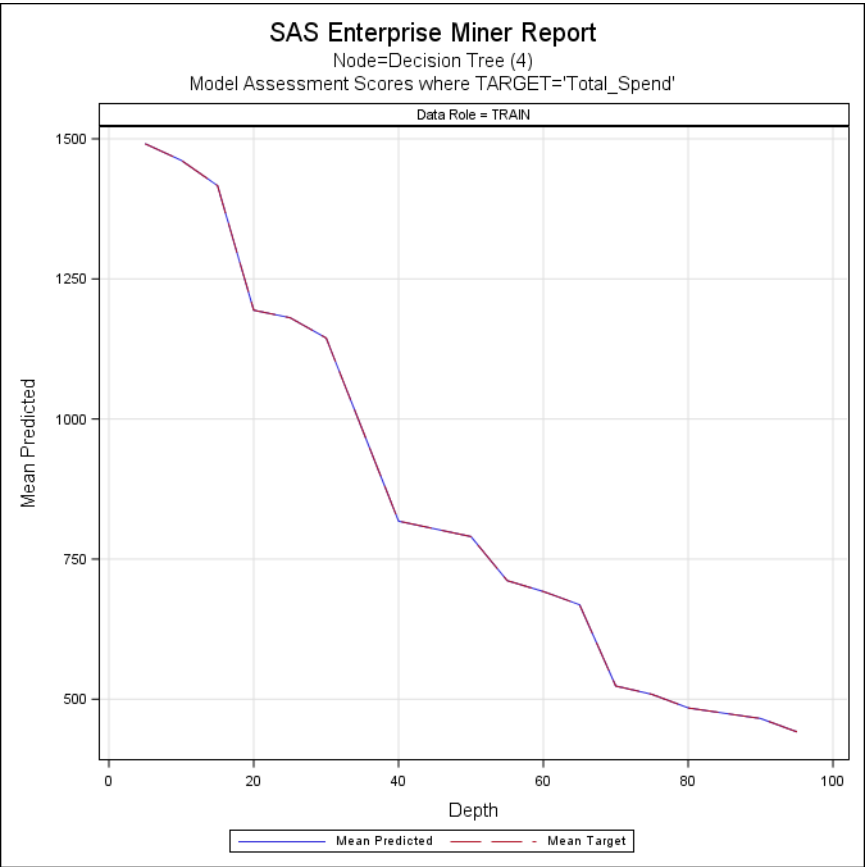


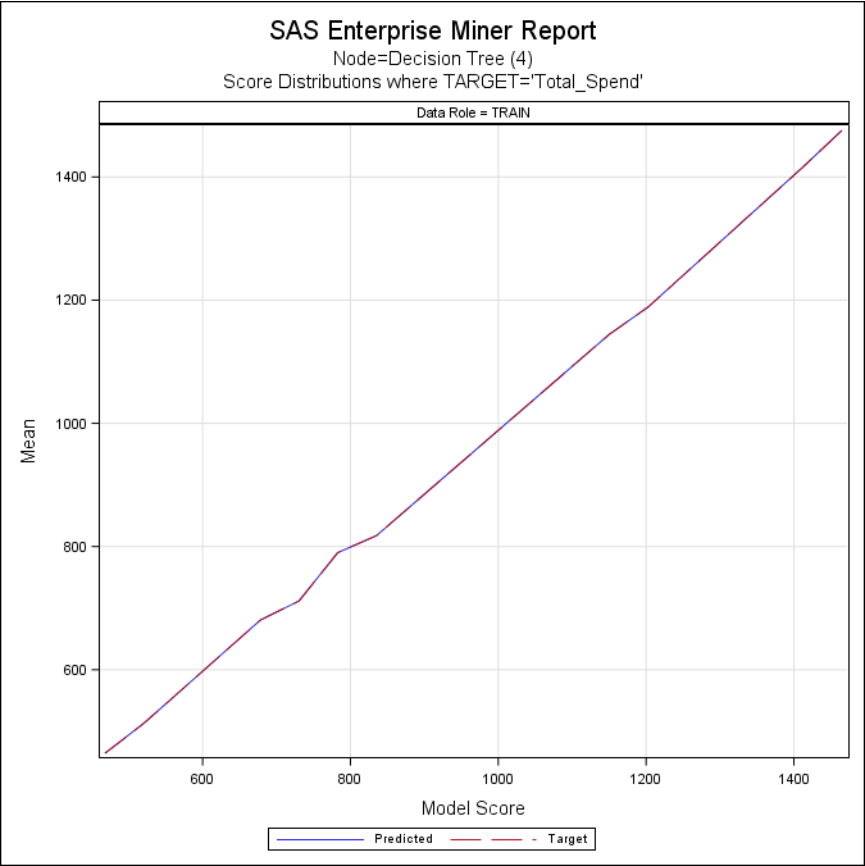
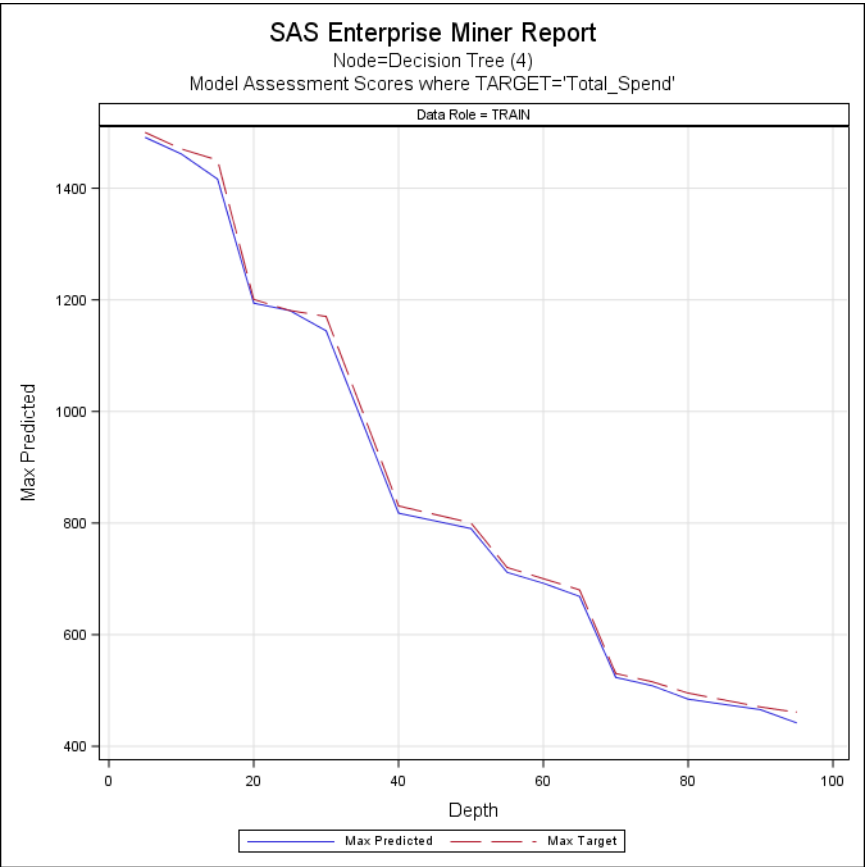
SAS Enterprise Miner Report
Node=Decision Tree (4)
Treemap



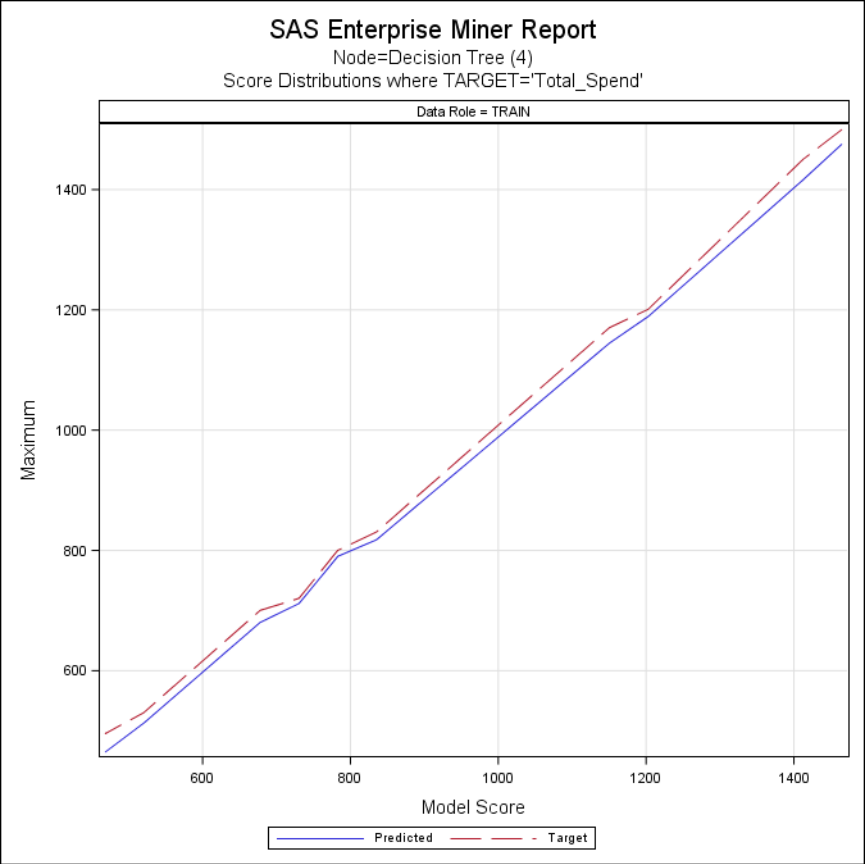
SAS Enterprise Miner Report
Node=Decision Tree (4)
Model Iteration Plots







SAS Enterprise Miner Report
Node=Decision Tree (4)
Score Distributions where TARGET='Total_Spend'



Node=Decision Tree (4)
Score Distributions

Target Variable=Total_Spend Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
1438.739 - 1491.211	1475.57	1491.21	1461.50	1475.57	1500.10	1450.50
1386.267 - 1438.739	1416.44	1416.44	1416.44	1416.44	1450.50	1370.20
1176.380 - 1228.852	1188.80	1194.13	1180.80	1188.80	1200.80	1180.80
1123.908 - 1176.380	1144.51	1144.51	1144.51	1144.51	1170.30	1120.20
809.076 - 861.548	817.76	817.76	817.76	817.76	830.75	800.90
756.604 - 809.076	790.20	790.20	790.20	790.20	800.20	780.20
704.132 - 756.604	711.65	711.65	711.65	711.65	720.40	710.40
651.660 - 704.132	680.41	692.18	668.63	680.41	700.40	660.30
494.245 - 546.717	513.02	523.47	508.67	513.02	530.40	505.75
441.773 - 494.245	464.40	484.42	441.77	464.40	495.25	420.80

SAS Enterprise Miner Report

Node=Decision Tree (3) Summary

Node id = Tree3
 Node label = Decision Tree (3)
 Meta path = FIMPORT => Filter => Part => Smpl2 => Tree3
 Notes =

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

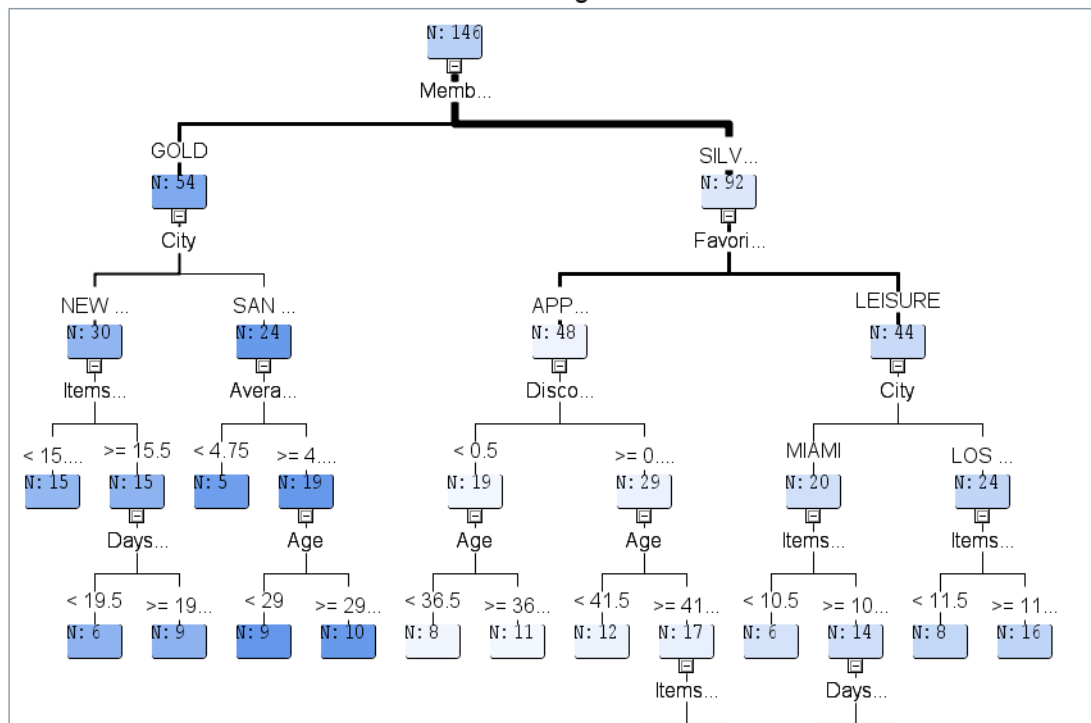
Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Total_Spend
INPUT	INTERVAL	8	Age Average_Rating Customer_ID Days_Since_Last_Purchase Days_Since_Last_Purchase_copy Discount_Applied Items_Purchased churn
INPUT	NOMINAL	5	City Favorite_Category Gender Membership_Type Satisfaction_Level
ID	INTERVAL	1	_dataobs_

Node=Decision Tree (3) Model Fit Statistics

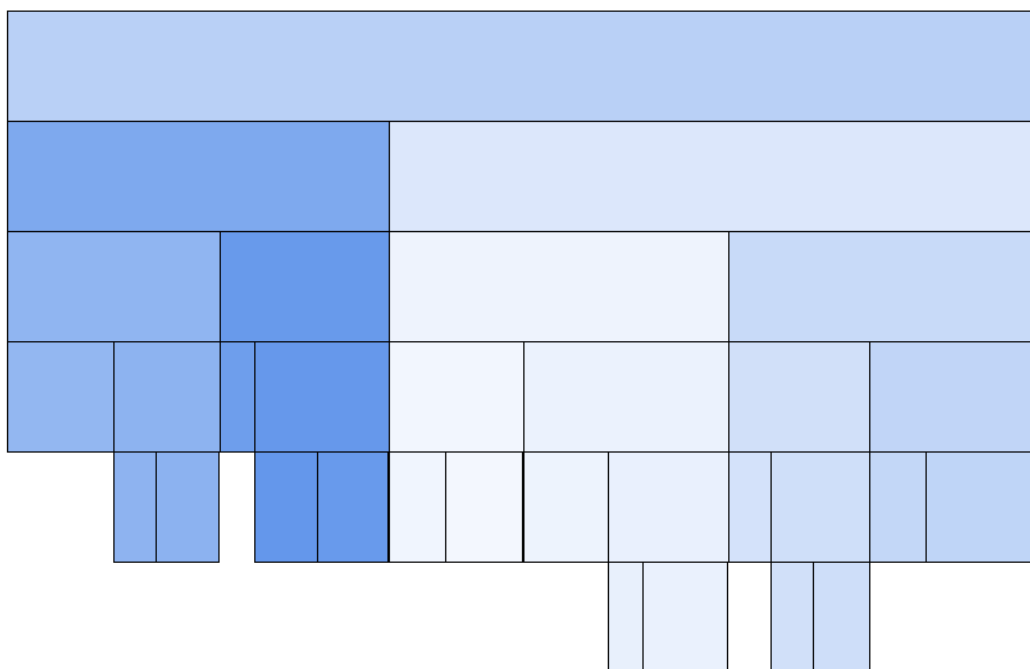
Target=Total_Spend Target Label=Total Spend

Label of Statistic	Train	Validation	Test
Sum of Frequencies	146.00	.	.
Maximum Absolute Error	46.24	.	.
Sum of Squared Errors	14313.04	.	.
Average Squared Error	98.03	.	.
Root Average Squared Error	9.90	.	.
Divisor for ASE	146.00	.	.
Total Degrees of Freedom	146.00	.	.

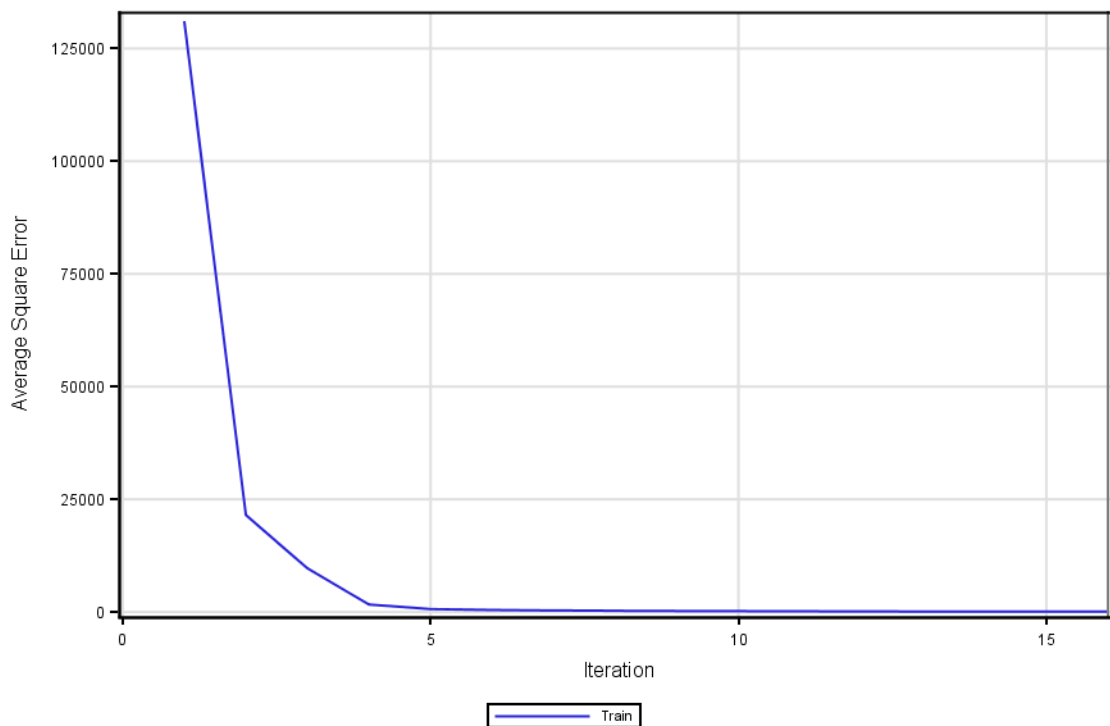
SAS Enterprise Miner Report
Node=Decision Tree (3)
Tree Diagram

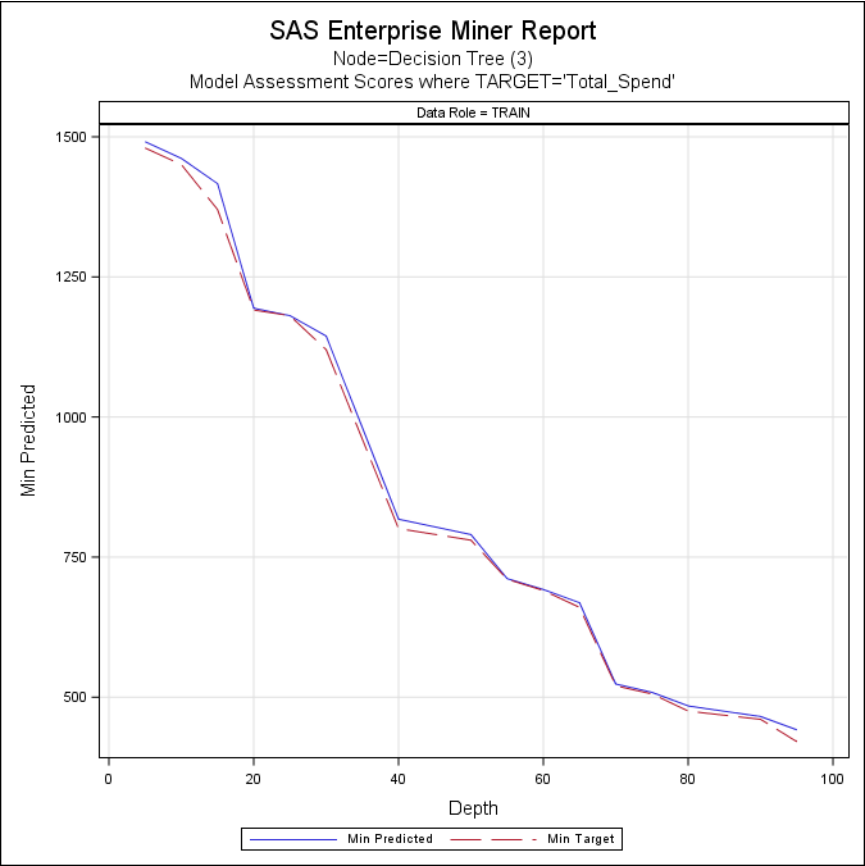
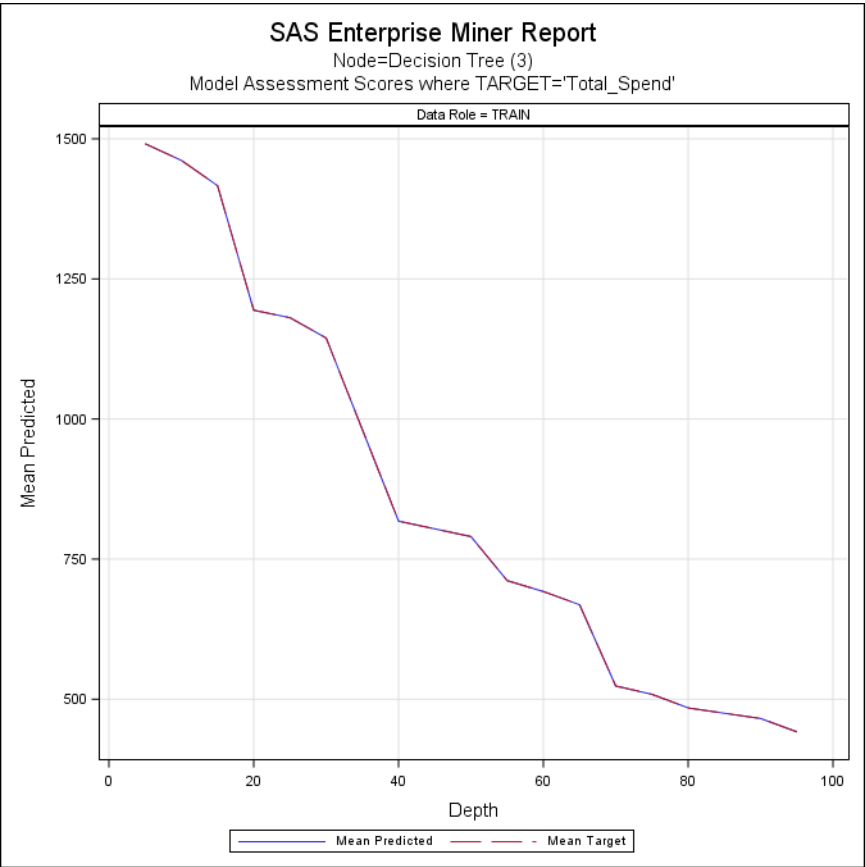


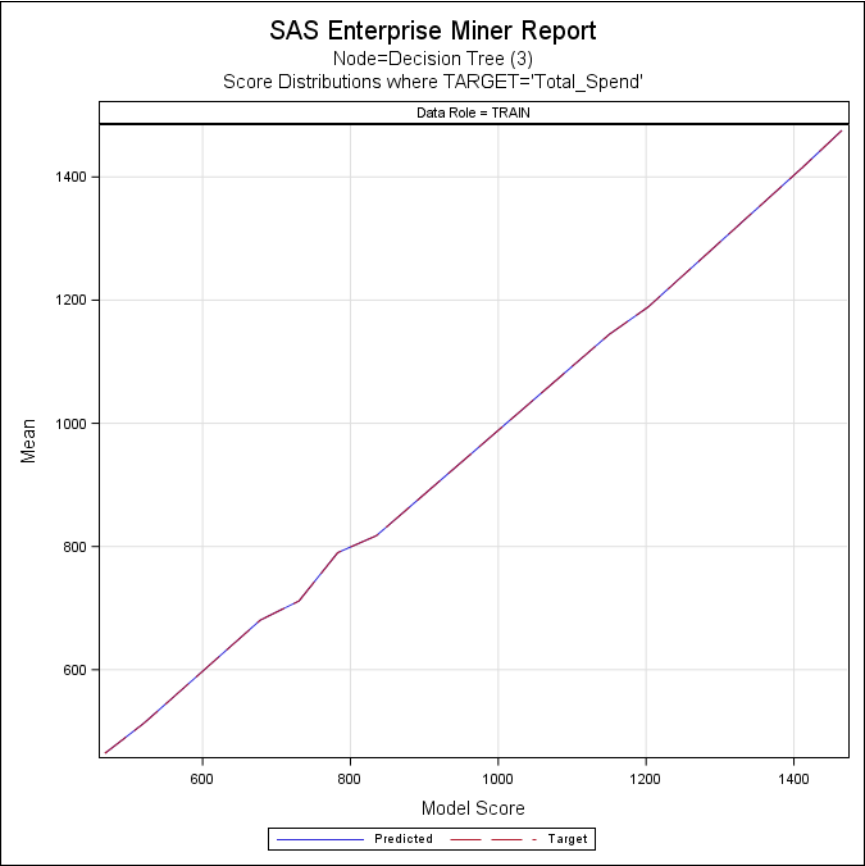
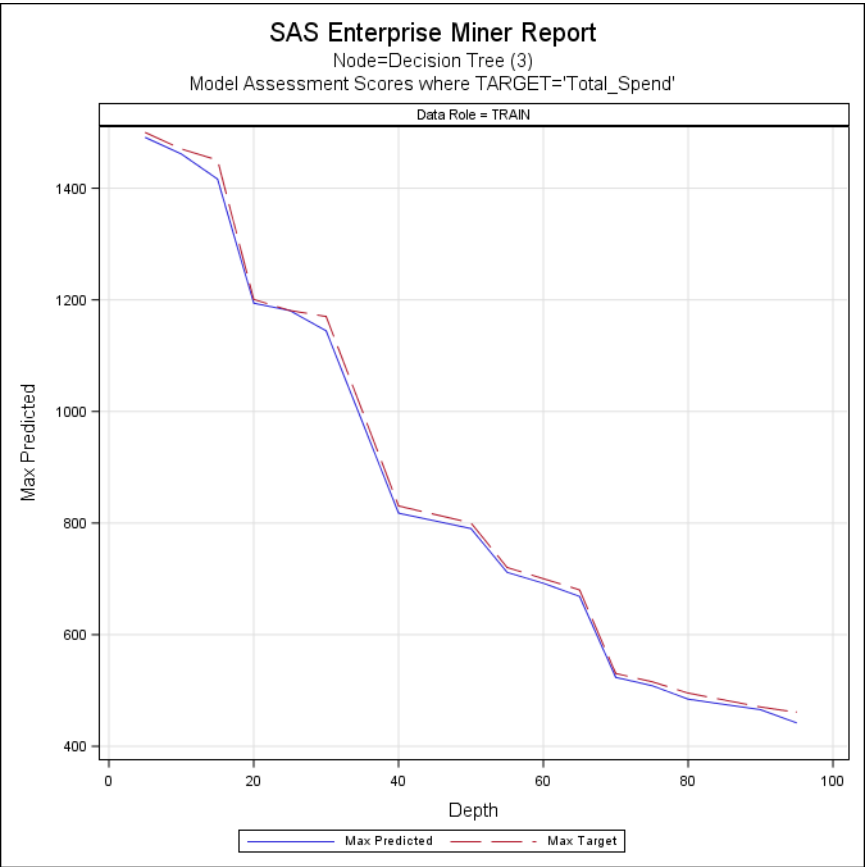
SAS Enterprise Miner Report
Node=Decision Tree (3)
Treemap

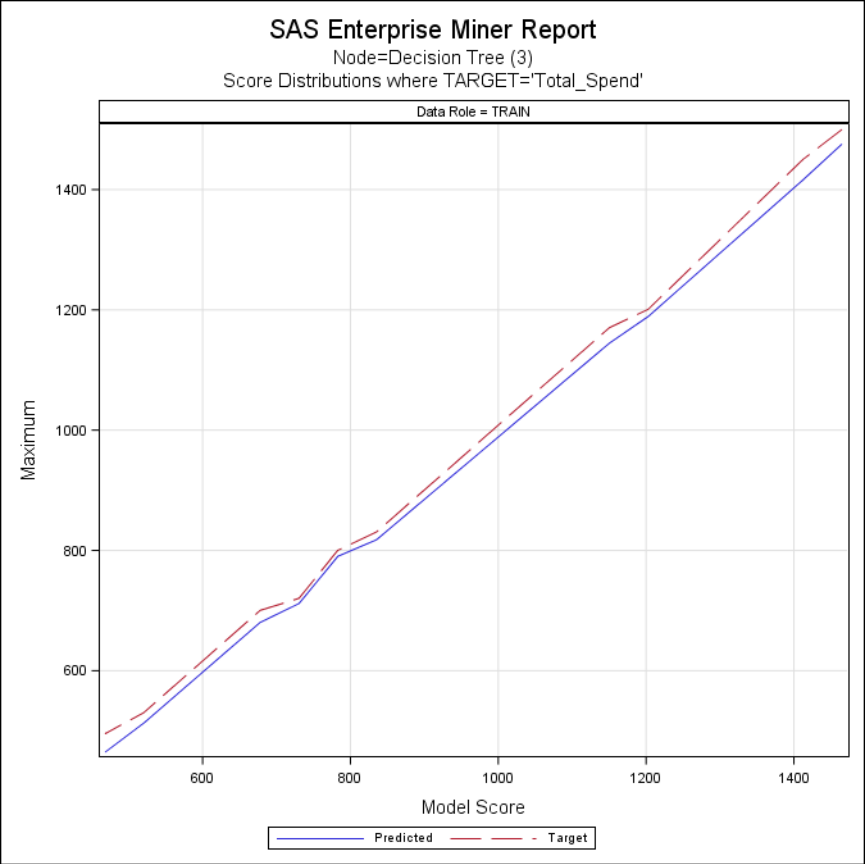


SAS Enterprise Miner Report
Node=Decision Tree (3)
Model Iteration Plots









Node=Decision Tree (3)
Score Distributions

Target Variable=Total_Spend Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
1438.739 - 1491.211	1475.57	1491.21	1461.50	1475.57	1500.10	1450.50
1386.267 - 1438.739	1416.44	1416.44	1416.44	1416.44	1450.50	1370.20
1176.380 - 1228.852	1188.80	1194.13	1180.80	1188.80	1200.80	1180.80
1123.908 - 1176.380	1144.51	1144.51	1144.51	1144.51	1170.30	1120.20
809.076 - 861.548	817.76	817.76	817.76	817.76	830.75	800.90
756.604 - 809.076	790.20	790.20	790.20	790.20	800.20	780.20
704.132 - 756.604	711.65	711.65	711.65	711.65	720.40	710.40
651.660 - 704.132	680.41	692.18	668.63	680.41	700.40	660.30
494.245 - 546.717	513.02	523.47	508.67	513.02	530.40	505.75
441.773 - 494.245	464.40	484.42	441.77	464.40	495.25	420.80

SAS Enterprise Miner Report

Node=Decision Tree (2) Summary

Node id = Tree2
 Node label = Decision Tree (2)
 Meta path = FIMPORT => Filter => Part => Smpl => Tree2
 Notes =

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

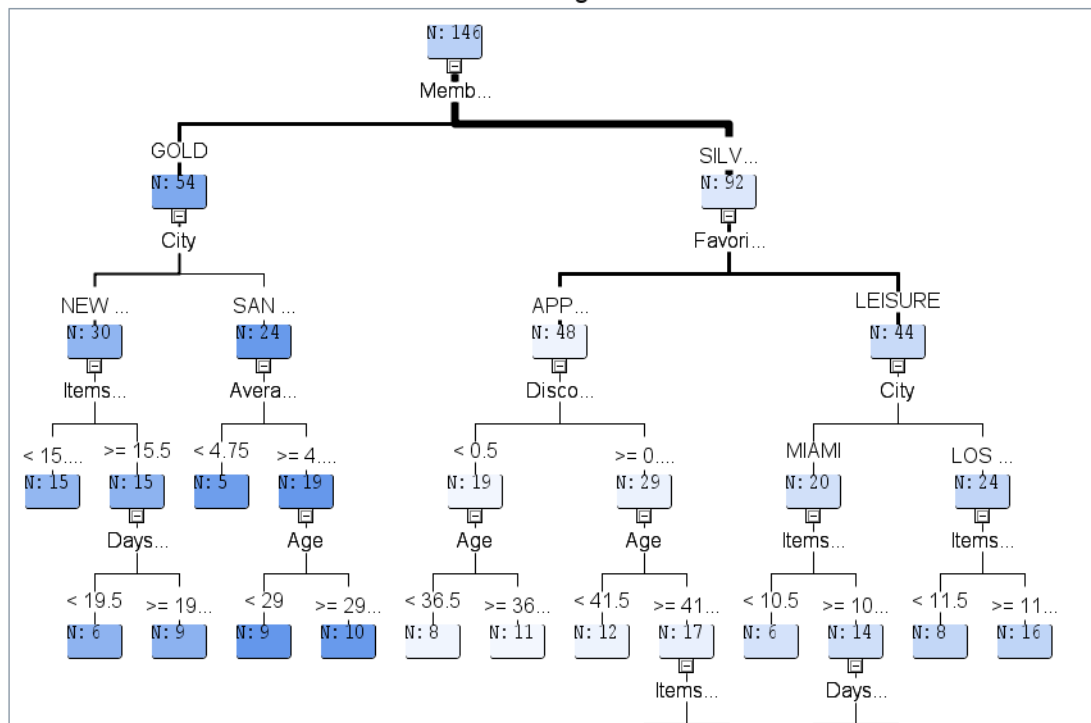
Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Total_Spend
INPUT	INTERVAL	8	Age Average_Rating Customer_ID Days_Since_Last_Purchase Days_Since_Last_Purchase_copy Discount_Applied Items_Purchased churn
INPUT	NOMINAL	5	City Favorite_Category Gender Membership_Type Satisfaction_Level
ID	INTERVAL	1	_dataobs_

Node=Decision Tree (2) Model Fit Statistics

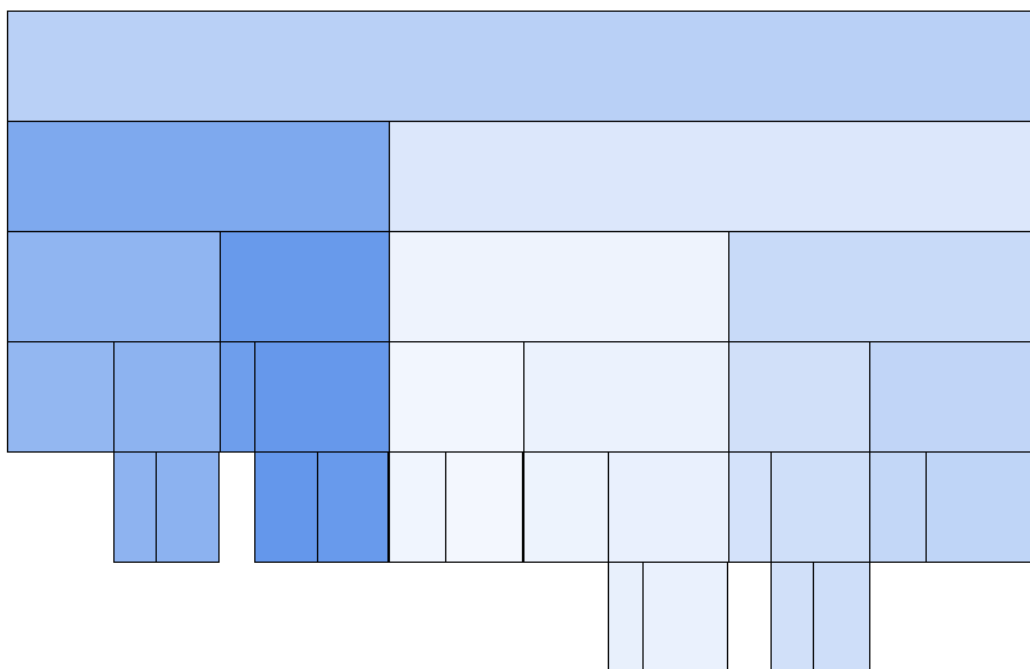
Target=Total_Spend Target Label=Total Spend

Label of Statistic	Train	Validation	Test
Sum of Frequencies	146.00	.	.
Maximum Absolute Error	46.24	.	.
Sum of Squared Errors	14313.04	.	.
Average Squared Error	98.03	.	.
Root Average Squared Error	9.90	.	.
Divisor for ASE	146.00	.	.
Total Degrees of Freedom	146.00	.	.

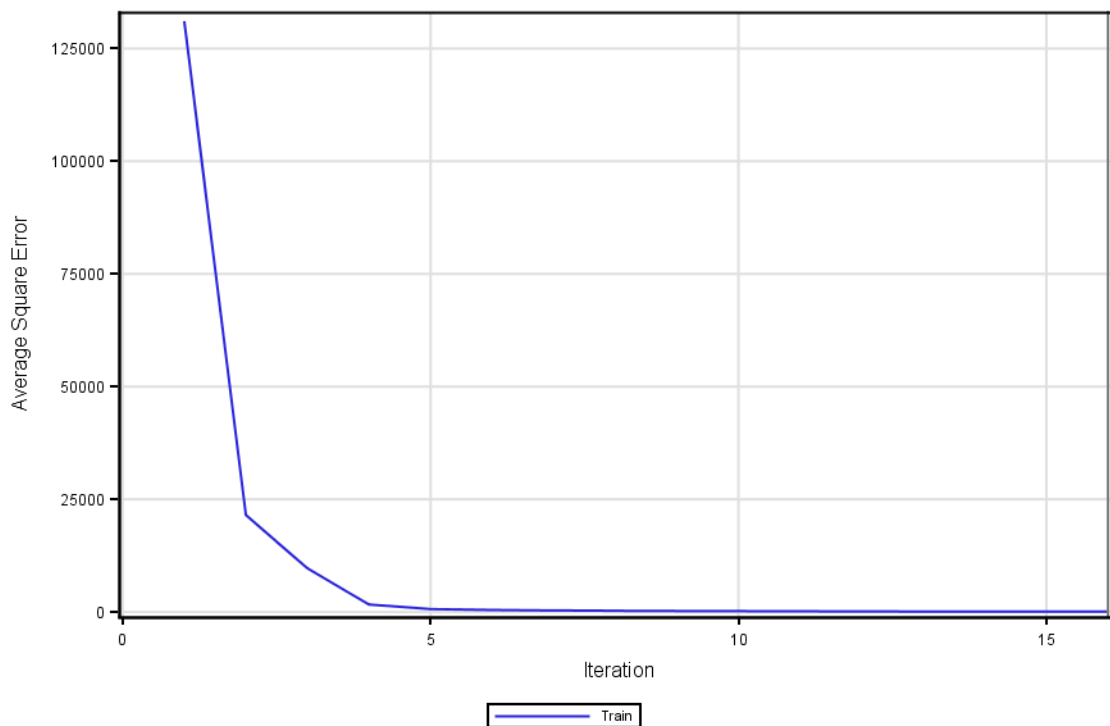
SAS Enterprise Miner Report
Node=Decision Tree (2)
Tree Diagram

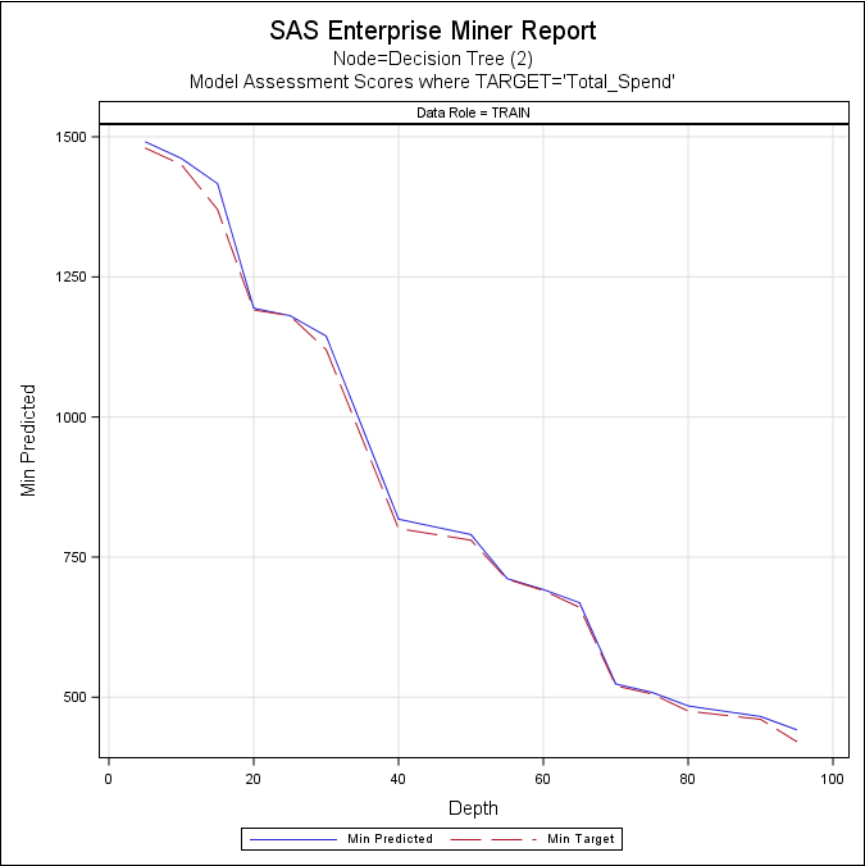
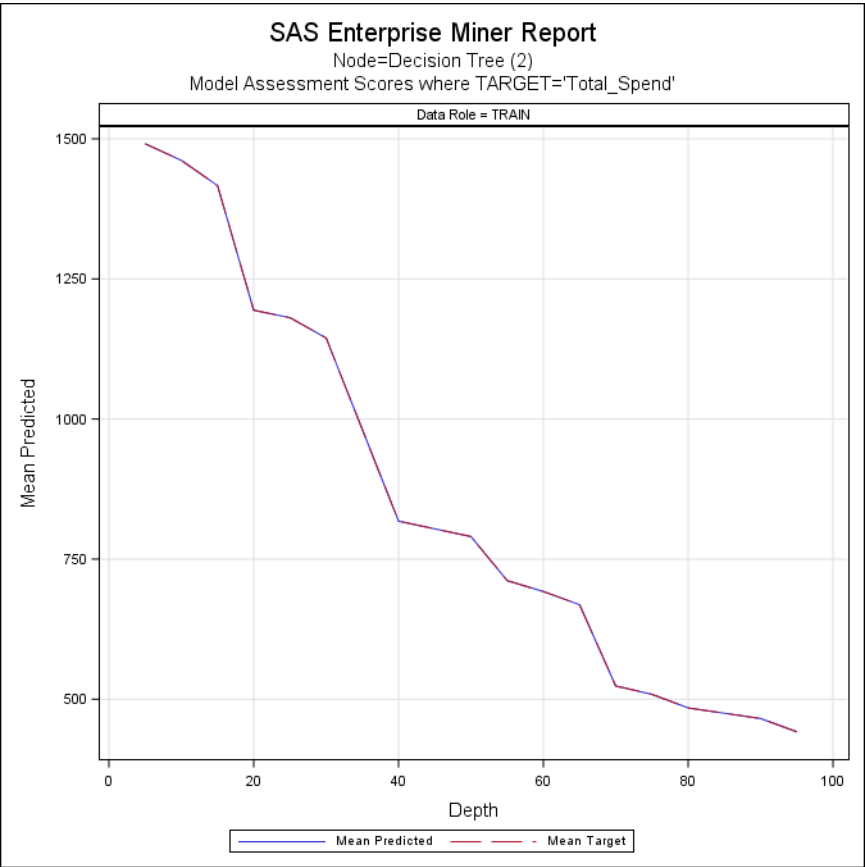


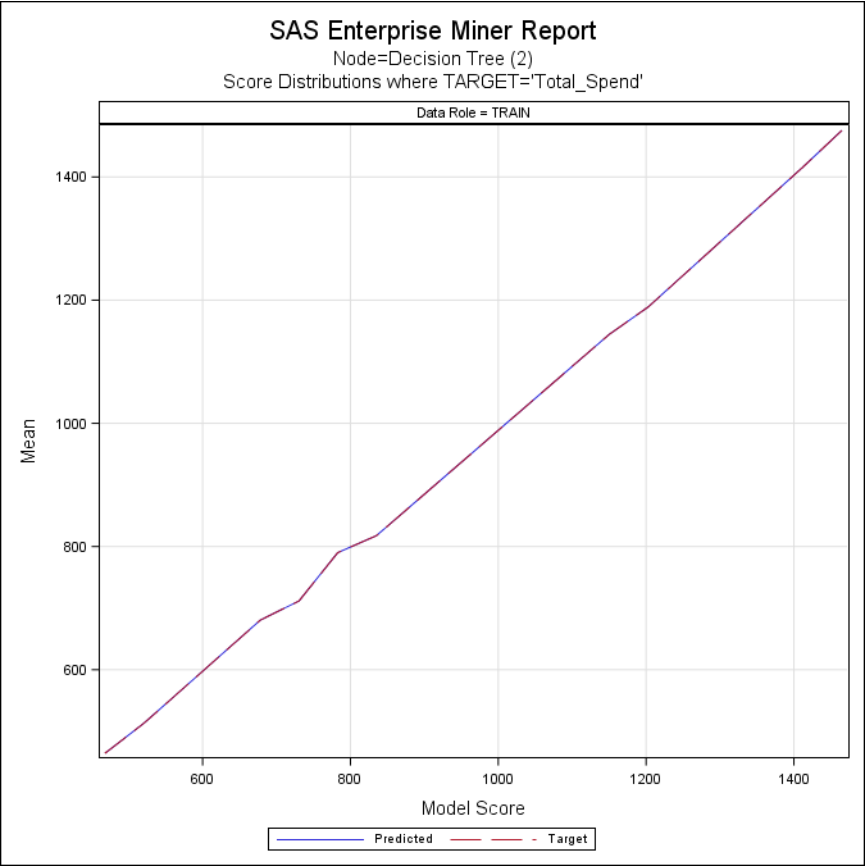
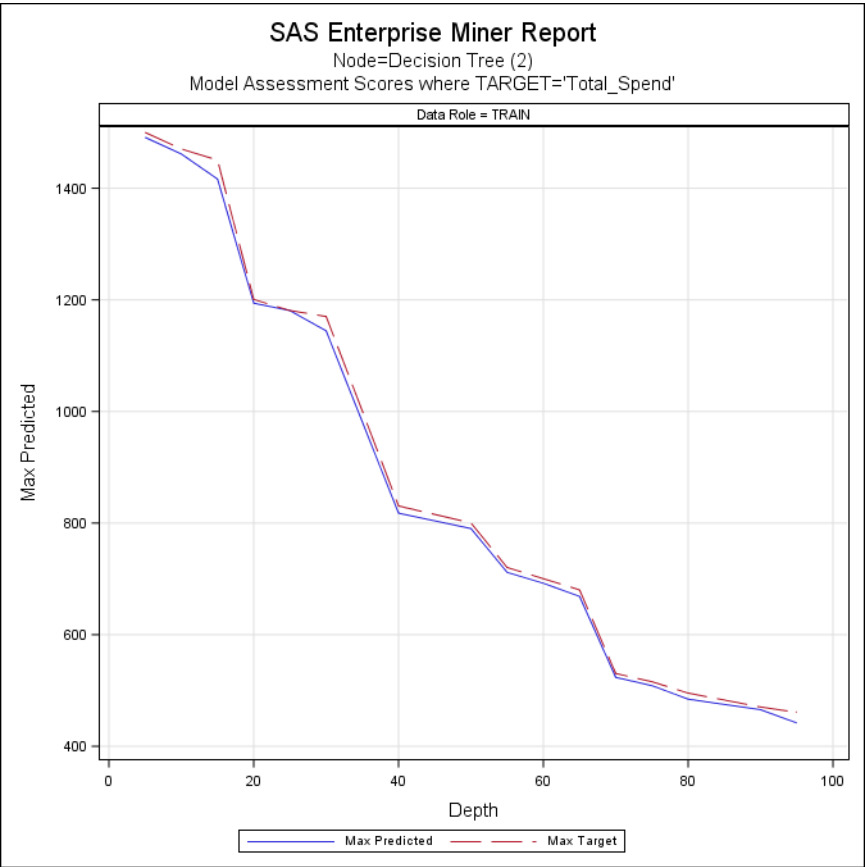
SAS Enterprise Miner Report
Node=Decision Tree (2)
Treemap

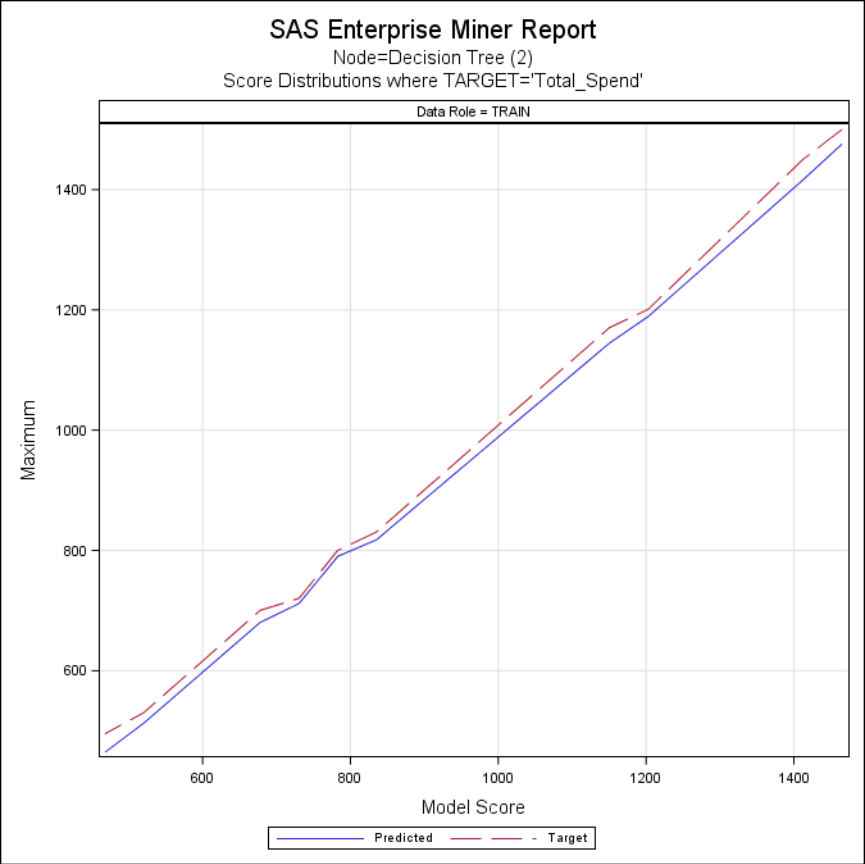


SAS Enterprise Miner Report
Node=Decision Tree (2)
Model Iteration Plots









Node=Decision Tree (2)
Score Distributions

Target Variable=Total_Spend Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
1438.739 - 1491.211	1475.57	1491.21	1461.50	1475.57	1500.10	1450.50
1386.267 - 1438.739	1416.44	1416.44	1416.44	1416.44	1450.50	1370.20
1176.380 - 1228.852	1188.80	1194.13	1180.80	1188.80	1200.80	1180.80
1123.908 - 1176.380	1144.51	1144.51	1144.51	1144.51	1170.30	1120.20
809.076 - 861.548	817.76	817.76	817.76	817.76	830.75	800.90
756.604 - 809.076	790.20	790.20	790.20	790.20	800.20	780.20
704.132 - 756.604	711.65	711.65	711.65	711.65	720.40	710.40
651.660 - 704.132	680.41	692.18	668.63	680.41	700.40	660.30
494.245 - 546.717	513.02	523.47	508.67	513.02	530.40	505.75
441.773 - 494.245	464.40	484.42	441.77	464.40	495.25	420.80

SAS Enterprise Miner Report

Node=Ensemble Summary

Node id = Ensmbl
Node label = Ensemble
Meta path = FIMPORT => Filter => Part => Smpl => Tree2 => Ensmbl
Notes =

Node=Ensemble Properties

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

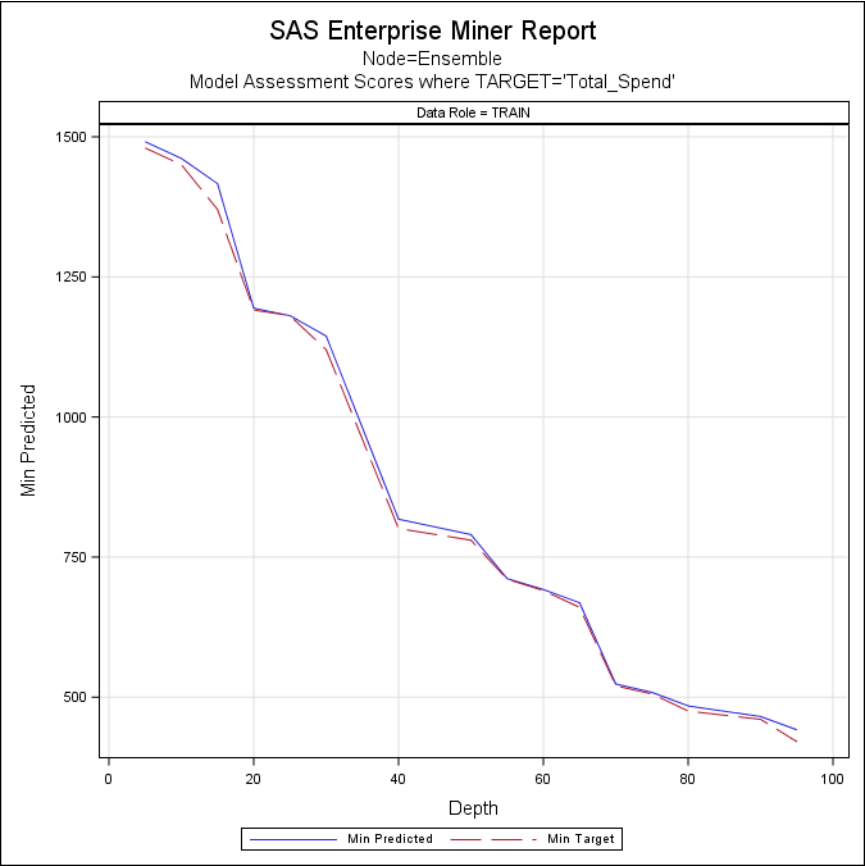
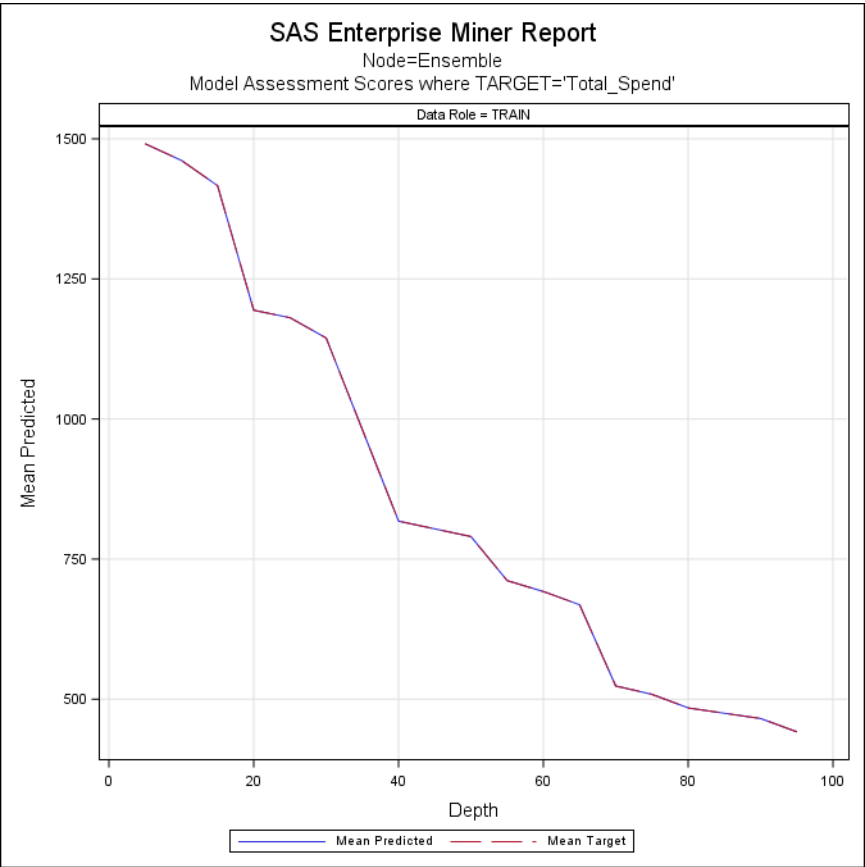
Node=Ensemble Variable Summary

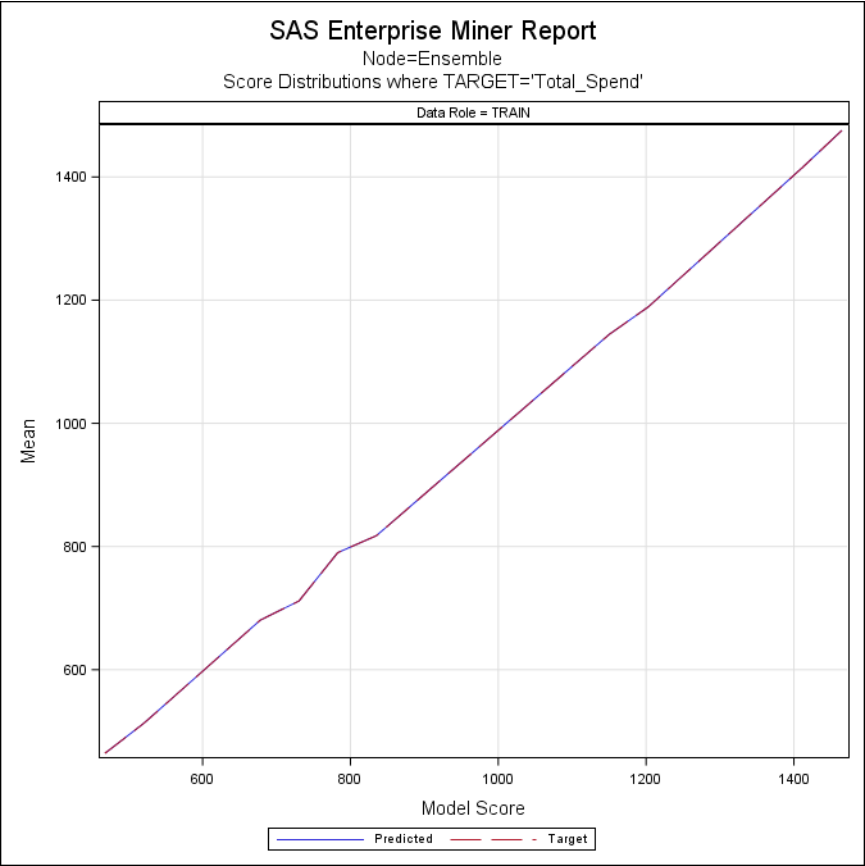
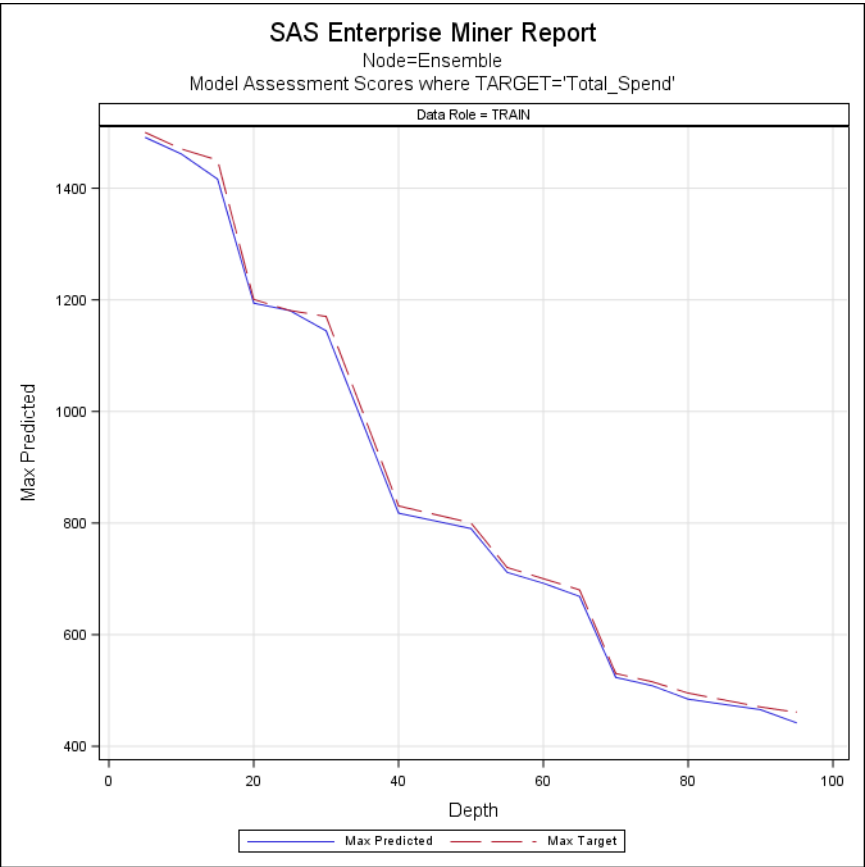
Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Total_Spend
INPUT	NOMINAL	3	City Favorite_Category Membership_Type

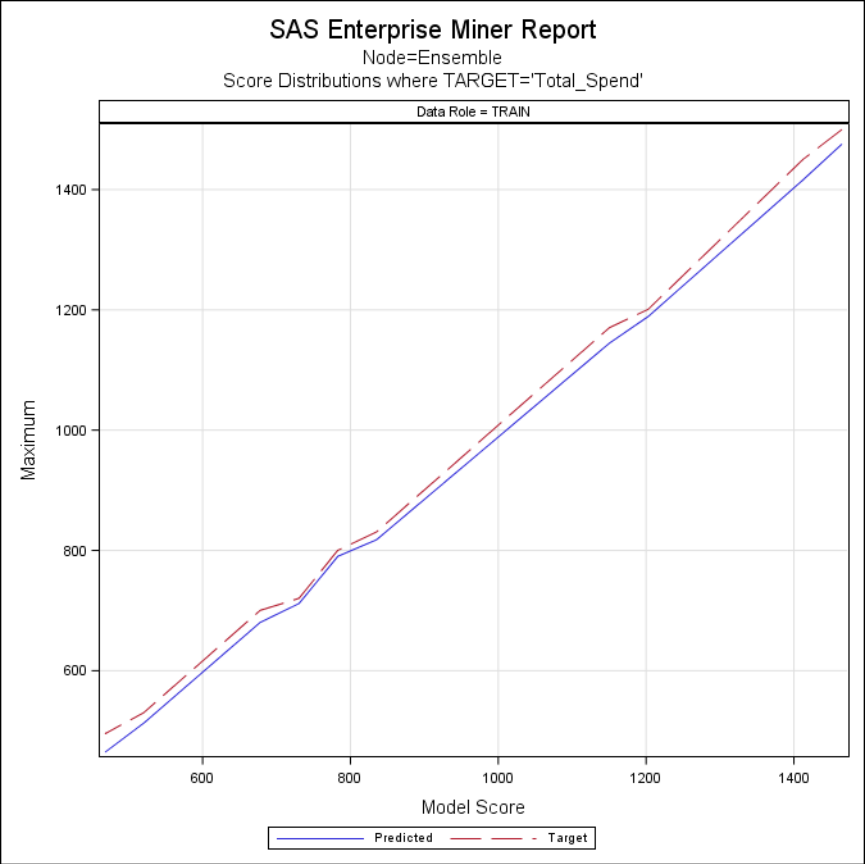
Node=Ensemble Model Fit Statistics

Target=Total_Spend Target Label=Total Spend

Label of Statistic	Train	Validation	Test
Average Squared Error	98.03	.	.
Divisor for ASE	146.00	.	.
Maximum Absolute Error	46.24	.	.
Sum of Frequencies	146.00	.	.
Root Average Squared Error	9.90	.	.
Sum of Squared Errors	14313.04	.	.







Node=Ensemble
Score Distributions

Target Variable=Total_Spend Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
1438.739 - 1491.211	1475.57	1491.21	1461.50	1475.57	1500.10	1450.50
1386.267 - 1438.739	1416.44	1416.44	1416.44	1416.44	1450.50	1370.20
1176.380 - 1228.852	1188.80	1194.13	1180.80	1188.80	1200.80	1180.80
1123.908 - 1176.380	1144.51	1144.51	1144.51	1144.51	1170.30	1120.20
809.076 - 861.548	817.76	817.76	817.76	817.76	830.75	800.90
756.604 - 809.076	790.20	790.20	790.20	790.20	800.20	780.20
704.132 - 756.604	711.65	711.65	711.65	711.65	720.40	710.40
651.660 - 704.132	680.41	692.18	668.63	680.41	700.40	660.30
494.245 - 546.717	513.02	523.47	508.67	513.02	530.40	505.75
441.773 - 494.245	464.40	484.42	441.77	464.40	495.25	420.80

SAS Enterprise Miner Report

Node=Decision Tree Summary

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

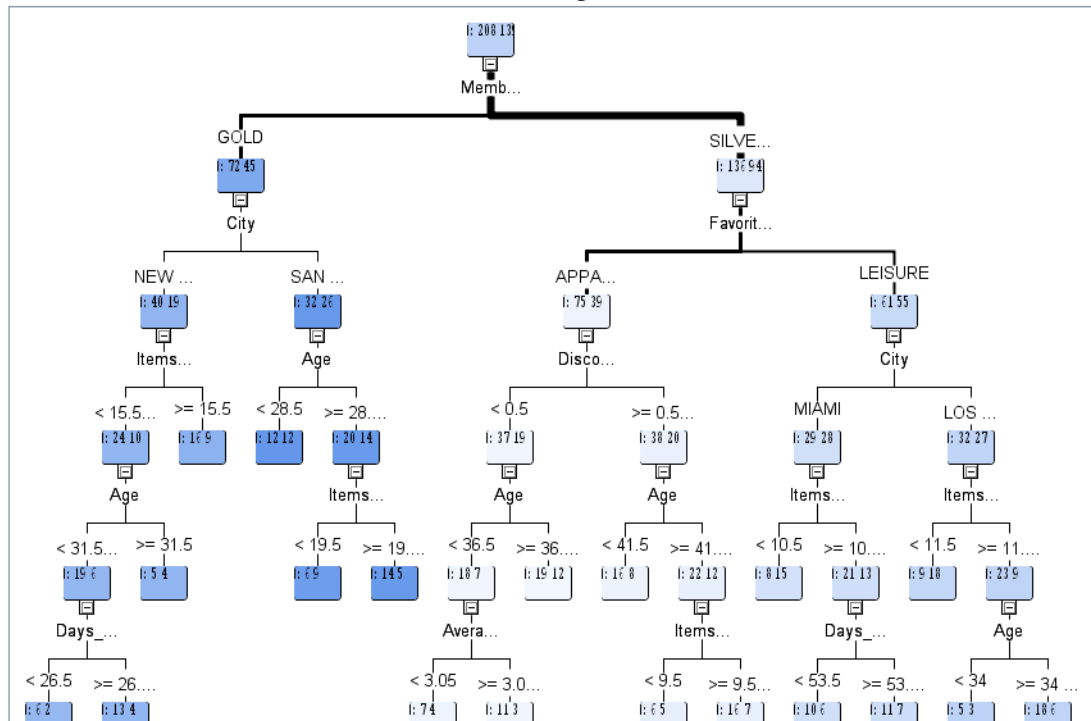
Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Total_Spend
INPUT	INTERVAL	8	Age Average_Rating Customer_ID Days_Since_Last_Purchase Days_Since_Last_Purchase_copy Discount_Applied Items_Purchased churn
INPUT	NOMINAL	5	City Favorite_Category Gender Membership_Type Satisfaction_Level
ID	INTERVAL	1	_dataobs_

Node=Decision Tree Model Fit Statistics

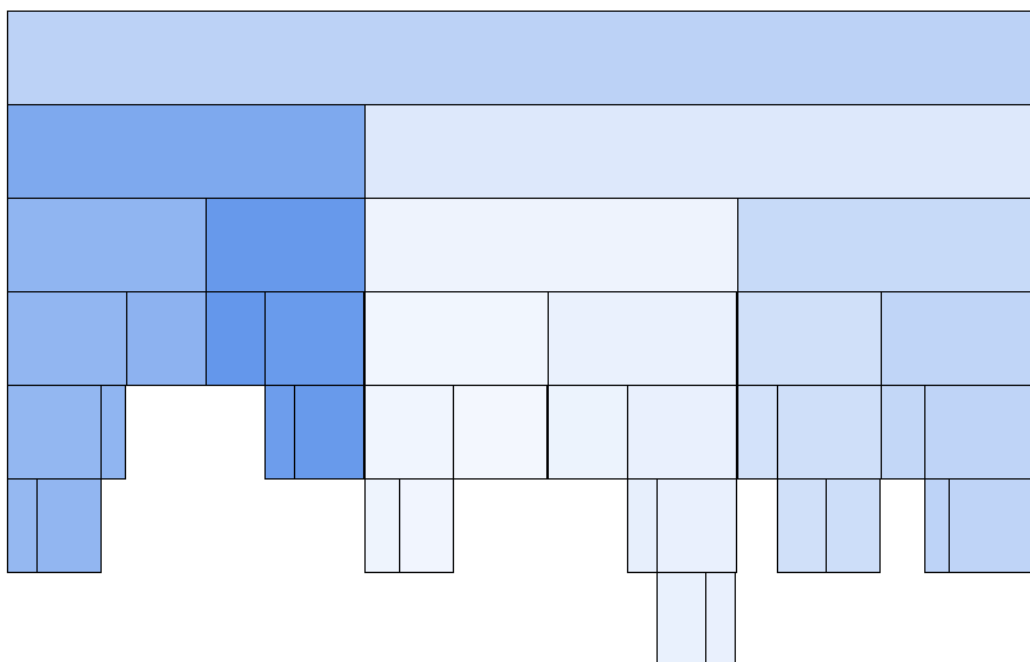
Target=Total_Spend Target Label=Total Spend

Label of Statistic	Train	Validation	Test
Sum of Frequencies	208.00	139.00	.
Maximum Absolute Error	56.88	66.88	.
Sum of Squared Errors	19241.15	35648.63	.
Average Squared Error	92.51	256.46	.
Root Average Squared Error	9.62	16.01	.
Divisor for ASE	208.00	139.00	.
Total Degrees of Freedom	208.00	.	.

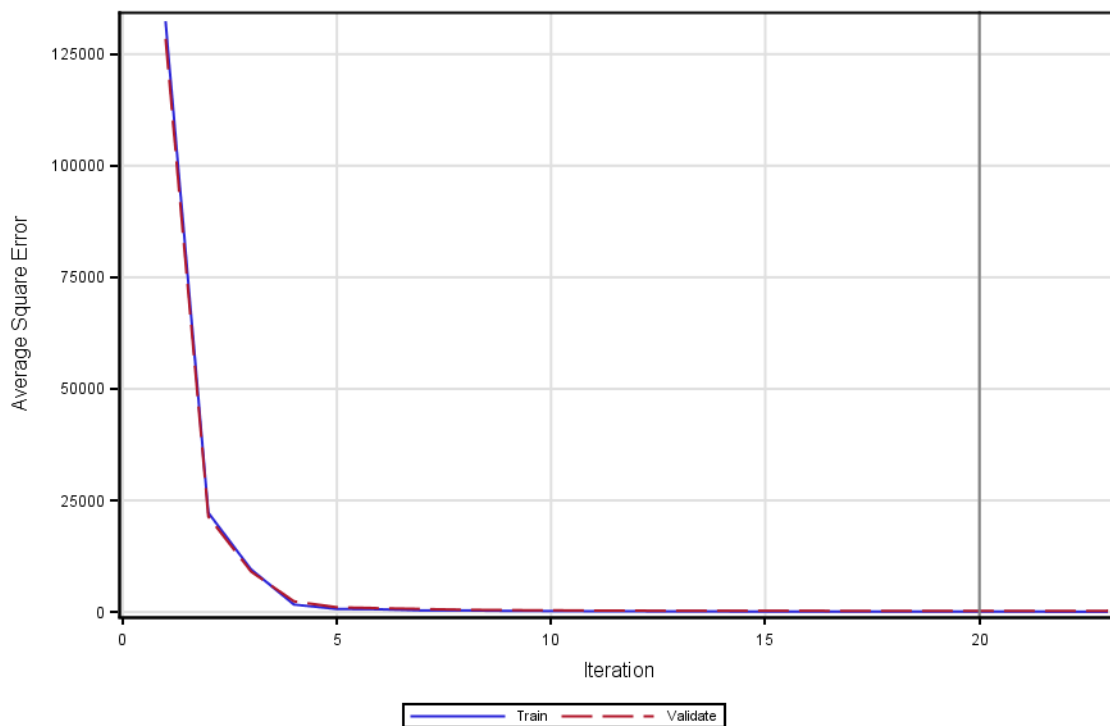
SAS Enterprise Miner Report Node=Decision Tree Tree Diagram

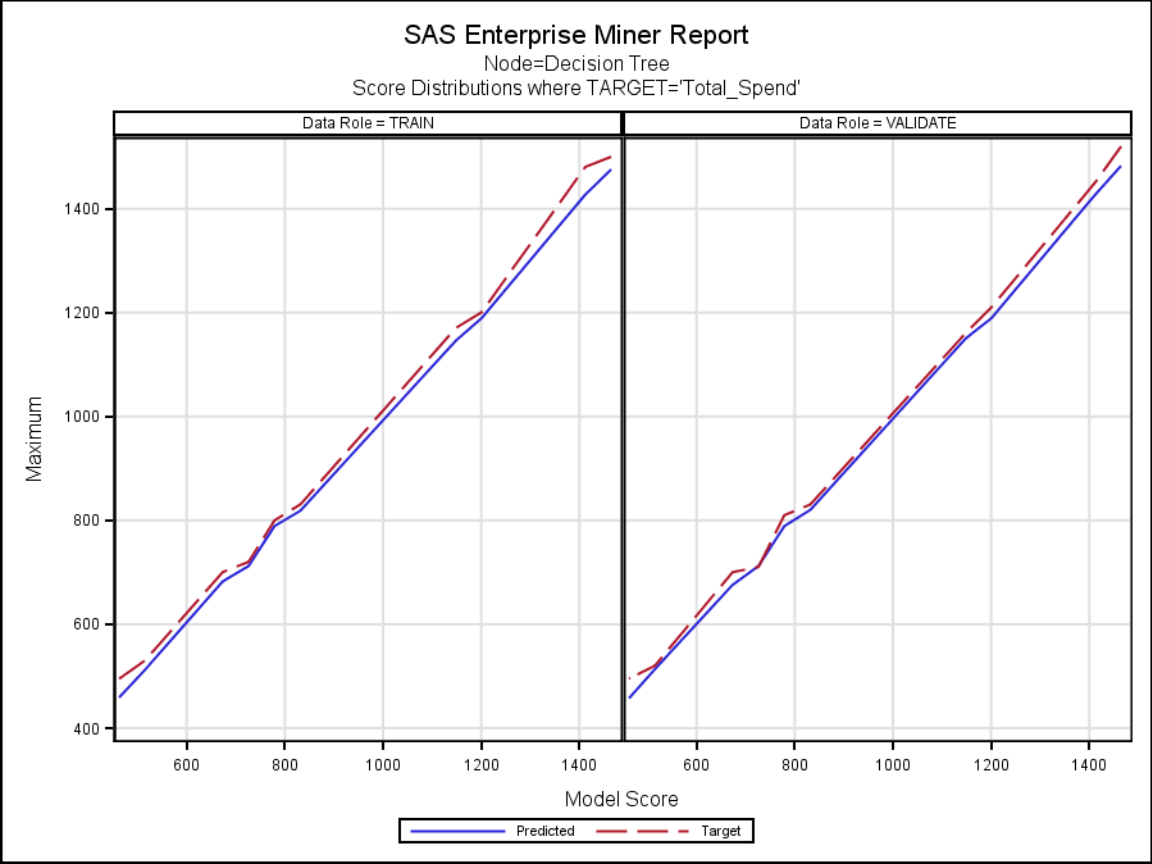
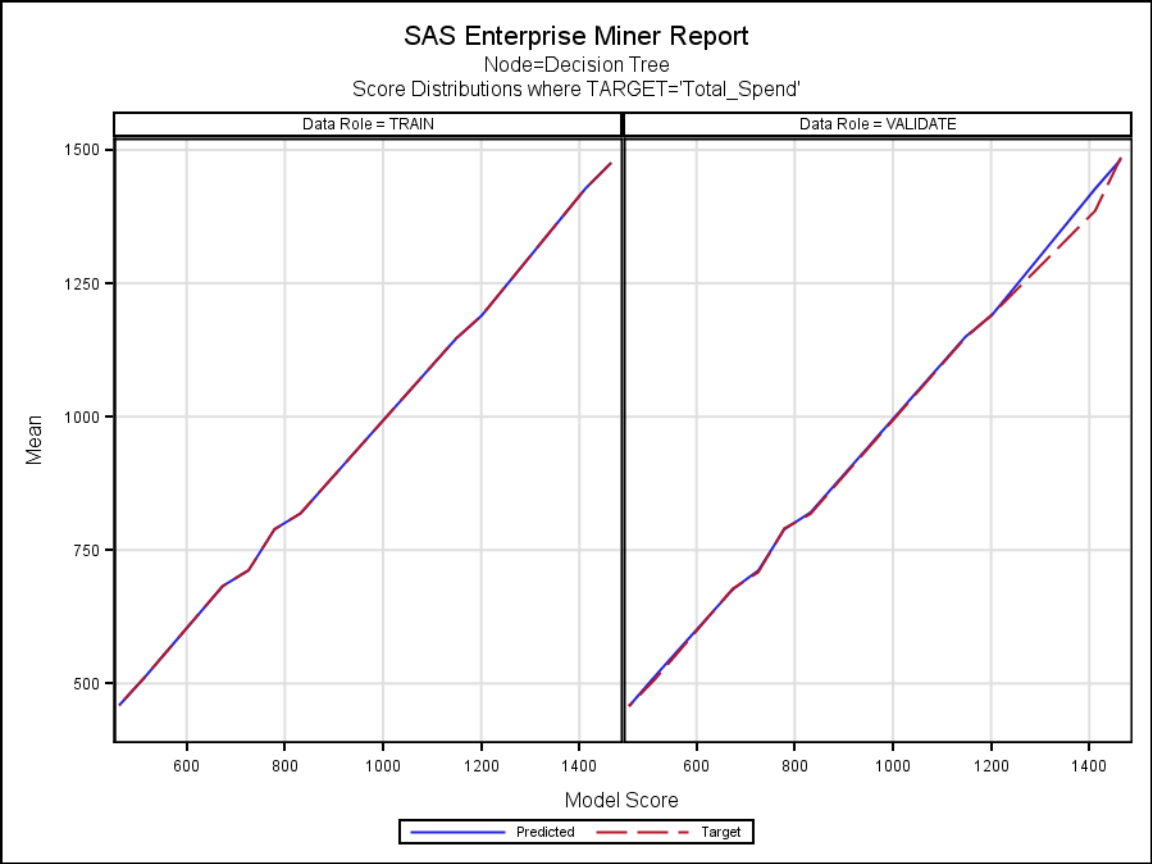


SAS Enterprise Miner Report
Node=Decision Tree
Treemap



SAS Enterprise Miner Report
Node=Decision Tree
Model Iteration Plots





Target Variable=Total_Spend Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
1438.192 - 1490.933	1475.70	1490.93	1462.64	1475.70	1500.10	1450.50
1385.450 - 1438.192	1427.08	1427.08	1427.08	1427.08	1480.30	1370.20
1174.483 - 1227.225	1189.55	1189.55	1189.55	1189.55	1200.80	1180.80
1121.742 - 1174.483	1145.94	1164.30	1128.87	1145.94	1170.30	1120.20
805.292 - 858.033	818.69	828.75	815.90	818.69	830.90	800.90
752.550 - 805.292	789.09	789.09	789.09	789.09	800.20	780.20
699.808 - 752.550	712.22	712.22	712.22	712.22	720.40	710.40
647.067 - 699.808	682.64	693.51	669.05	682.64	700.60	660.30
488.842 - 541.583	512.49	522.96	506.25	512.49	530.40	505.75
436.100 - 488.842	459.04	484.63	436.10	459.04	495.25	420.80

Target Variable=Total_Spend Data Role=VALIDATE

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
1438.192 - 1490.933	1482.61	1490.93	1462.64	1486.10	1520.10	1460.50
1385.450 - 1438.192	1427.08	1427.08	1427.08	1385.82	1450.50	1360.20
1174.483 - 1227.225	1189.55	1189.55	1189.55	1190.78	1210.60	1170.80
1121.742 - 1174.483	1150.19	1164.30	1128.87	1148.48	1160.60	1130.60
805.292 - 858.033	820.18	828.75	815.90	817.52	830.75	800.90
752.550 - 805.292	789.09	789.09	789.09	790.81	810.20	770.20
699.808 - 752.550	712.22	712.22	712.22	708.97	710.40	700.40
647.067 - 699.808	676.04	693.51	669.05	677.50	700.40	660.30
488.842 - 541.583	513.73	522.96	506.25	507.70	520.40	495.25
436.100 - 488.842	457.58	484.63	436.10	457.97	495.25	410.80

SAS Enterprise Miner Report

Node=Gradient Boosting
Summary

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

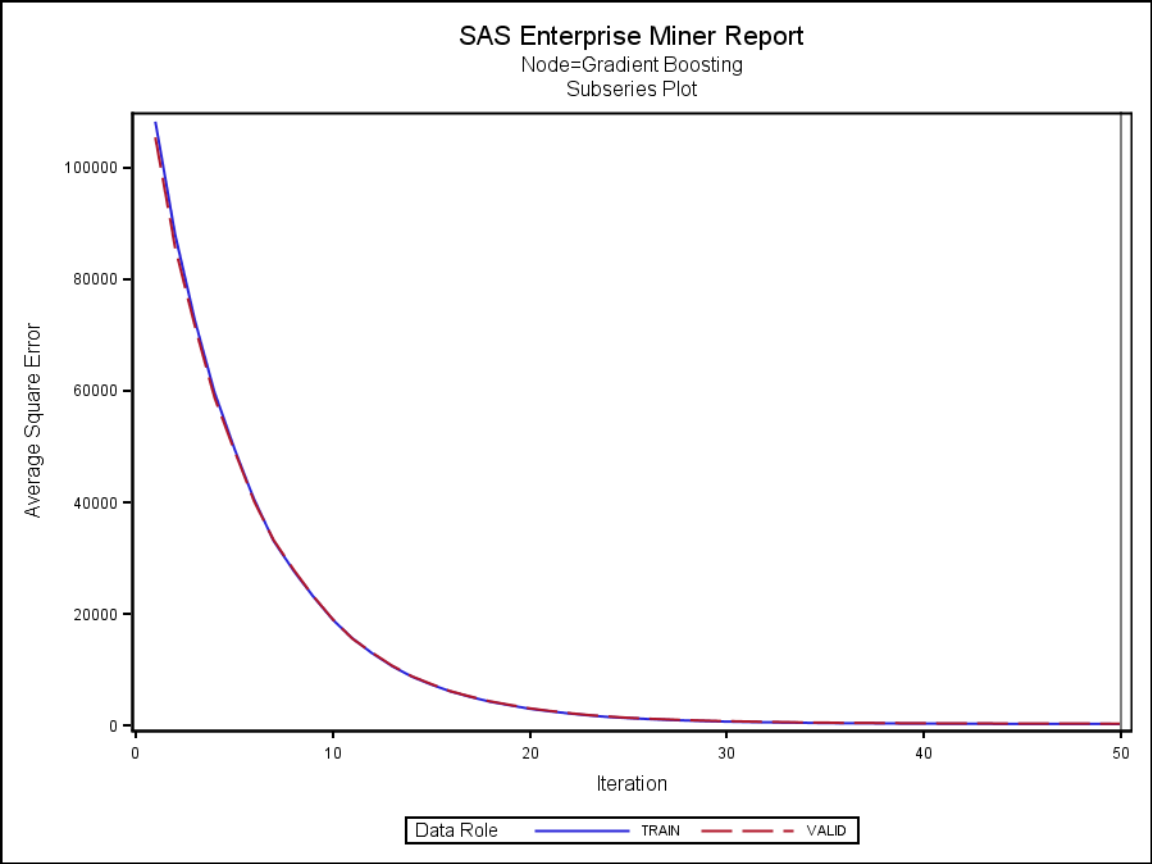
Node=Gradient Boosting
Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Total_Spend
INPUT	INTERVAL	8	Age Average_Rating Customer_ID Days_Since_Last_Purchase Days_Since_Last_Purchase_copy Discount_Applied Items_Purchased churn
INPUT	NOMINAL	5	City Favorite_Category Gender Membership_Type Satisfaction_Level
ID	INTERVAL	1	_dataobs_

Node=Gradient Boosting
Model Fit Statistics

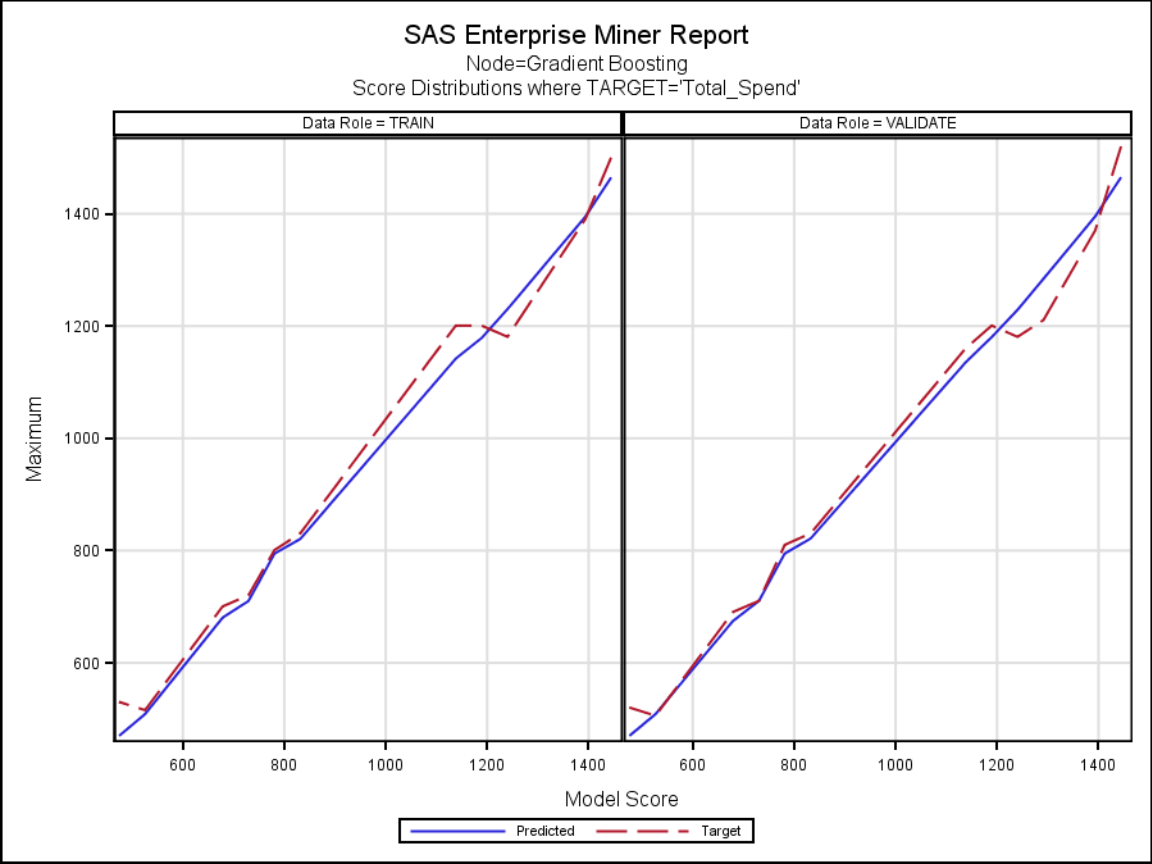
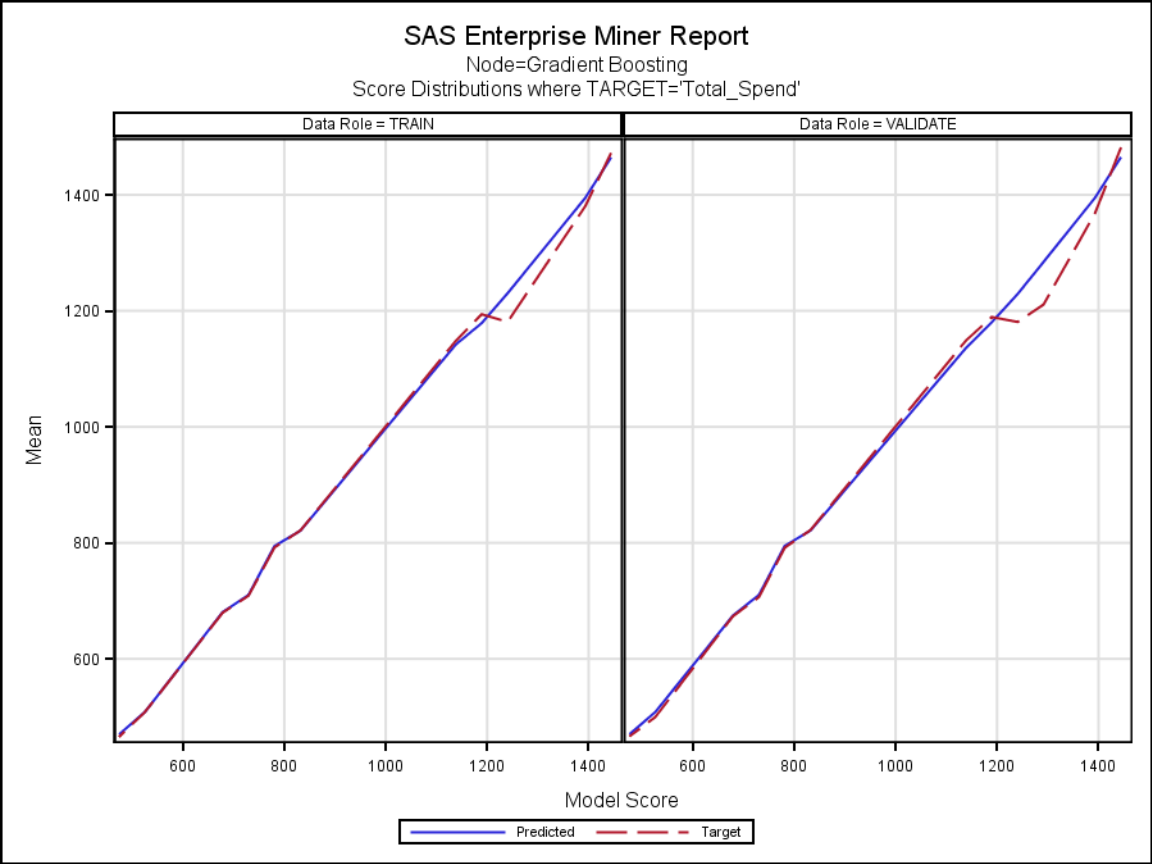
Target=Total_Spend Target Label=Total Spend

Label of Statistic	Train	Validation	Test
Sum of Frequencies	208.00	139.00	.
Sum of Case Weights Times Freq	208.00	139.00	.
Maximum Absolute Error	55.15	73.39	.
Sum of Squared Errors	57546.74	45847.88	.
Average Squared Error	276.67	329.84	.
Root Average Squared Error	16.63	18.16	.
Divisor for ASE	208.00	139.00	.
Total Degrees of Freedom	208.00	.	.



Node=Gradient Boosting
Variable Importance

Variable Name	Label	Number of Splitting Rules	Importance	Validation Importance	Ratio of Validation to Training Importance
Items_Purchased		54	1.00000	1.00000	1.00000
Average_Rating		18	0.37267	0.35246	0.94579
Days_Since_Last_Purchase		25	0.23094	0.22043	0.95448
City	City	20	0.21136	0.20469	0.96846
Satisfaction_Level		6	0.19934	0.19391	0.97277
Age	Age	7	0.14612	0.13560	0.92806
Customer_ID		5	0.02148	0.00058	0.02690
churn	churn	0	0.00000	0.00000	.
Discount_Applied		0	0.00000	0.00000	.
Membership_Type		0	0.00000	0.00000	.
Gender	Gender	0	0.00000	0.00000	.
Favorite_Category		0	0.00000	0.00000	.
Days_Since_Last_Purchase_copy		0	0.00000	0.00000	.



Target Variable=Total_Spend Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
1418.712 - 1469.757	1464.68	1469.76	1446.68	1472.34	1500.10	1420.80
1367.667 - 1418.712	1394.60	1397.05	1392.15	1380.20	1390.20	1370.20
1214.533 - 1265.578	1230.12	1235.95	1228.95	1180.80	1180.80	1180.80
1163.488 - 1214.533	1178.77	1188.40	1175.34	1194.13	1200.80	1190.80
1112.443 - 1163.488	1141.89	1158.92	1129.75	1148.13	1200.80	1120.20
806.174 - 857.219	820.89	841.77	813.19	821.36	830.90	810.90
755.129 - 806.174	794.53	797.47	792.70	792.04	800.90	780.20
704.084 - 755.129	710.36	711.24	709.75	708.97	720.40	690.40
653.040 - 704.084	680.65	700.09	669.51	679.75	700.60	660.30
499.905 - 550.950	508.64	508.95	508.15	508.56	515.75	505.75
448.860 - 499.905	469.92	497.45	448.86	465.54	530.40	420.80

Target Variable=Total_Spend Data Role=VALIDATE

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
1418.768 - 1469.757	1465.08	1469.76	1458.72	1481.83	1520.10	1440.50
1367.779 - 1418.768	1395.24	1401.98	1392.15	1368.77	1370.20	1360.20
1265.801 - 1316.790	1283.99	1283.99	1283.99	1210.60	1210.60	1210.60
1214.812 - 1265.801	1228.95	1228.95	1228.95	1180.80	1180.80	1180.80
1163.823 - 1214.812	1180.21	1187.11	1175.34	1189.37	1200.80	1170.80
1112.834 - 1163.823	1135.69	1145.05	1128.26	1148.48	1160.60	1130.60
806.899 - 857.889	821.44	828.96	814.10	822.26	830.75	810.90
755.910 - 806.899	794.76	801.51	793.07	791.82	810.20	770.20
704.921 - 755.910	710.22	711.24	709.75	706.40	710.40	700.40
653.932 - 704.921	674.78	699.40	669.51	673.68	690.60	660.30
500.965 - 551.954	508.61	509.61	508.15	500.00	505.75	495.25
449.976 - 500.965	470.11	497.45	449.98	466.38	520.40	410.80

End of Report