

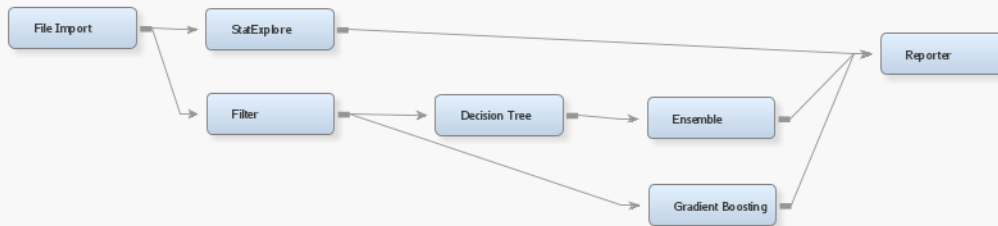
SAS Enterprise Miner Report

User = u63458034
Date = 11:09:45 08 January 2024
Project = AA 7005
Diagram = AA

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

Format = PDF
Style = LISTING

SAS Enterprise Miner Report Process Flow Diagram



SAS Enterprise Miner Report

Node=File Import
Summary

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

Node=File Import
Properties

Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	FileImport		GuessRows	500		NameRow	Y	
AccessTable	NoTableName		IFileName	C:\Users\saph\Downloads\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	07 January 2024 08:26:35	Data Size	132096
Data Type	DATA	Date Modified	07 January 2024 08:26:35	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.	
Age_Group	Age Group	INPUT	NOMINAL	C	8	\$8.	
Average_Rating	Average Rating	INPUT	INTERVAL	N	8	BEST.	
Churn	Churn	INPUT	INTERVAL	N	8	BEST.	
City	City	INPUT	NOMINAL	C	13	\$13.	
Customer_ID	Customer ID	ID	INTERVAL	N	8	BEST.	
Days_Since_Last_Purchase	Days Since Last Purchase	INPUT	INTERVAL	N	8	BEST.	
Discount_Applied	Discount Applied	INPUT	INTERVAL	N	8	BEST.	
Favorite_Category	Favorite Category	INPUT	NOMINAL	C	19	\$19.	
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.	

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	N	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	ALL	TRAIN
KeepMissingClass	N	Y	NormalizeClassValue	Y		UpdateClassLevel	N	

Node=Filter Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Total_Spend
INPUT	INTERVAL	5	Average_Rating Churn Days_Since_Last_Purchase Discount_Applied Items_Purchased
INPUT	NOMINAL	6	Age_Group City Favorite_Category Gender Membership_Type Satisfaction_Level

Node=Filter Excluded Class Values

Variable	Role	Level	Train Count	Train Percent	Label	Filter Method
Age_Group	INPUT	_BLANK_	0	0.00000	Age Group	
City	INPUT	_BLANK_	0	0.00000	City	
Favorite_Category	INPUT	BOOKS AND MEDIA	1	0.28736	Favorite Category	MINPCT
Favorite_Category	INPUT	_BLANK_	0	0.00000	Favorite Category	
Gender	INPUT	_BLANK_	0	0.00000	Gender	
Membership_Type	INPUT	_BLANK_	0	0.00000	Membership Type	
Satisfaction_Level	INPUT	_BLANK_	0	0.00000	Satisfaction Level	

Node=Filter Limits for Interval Variables

Variable	Role	Minimum	Maximum	Filter Method	Keep Missing Values	Label
Average_Rating	INPUT	2.2861	5.7610	STDDEV	N	Average Rating
Churn	INPUT	-1.0342	1.4940	STDDEV	N	Churn
Days_Since_Last_Purchase	INPUT	-13.8093	67.0392	STDDEV	N	Days Since Last Purchase
Discount_Applied	INPUT	-0.9993	2.0050	STDDEV	N	Discount Applied
Items_Purchased	INPUT	0.1939	25.0704	STDDEV	N	Items Purchased

SAS Enterprise Miner Report

Node=Decision Tree Summary

Node id = Tree
Node label = Decision Tree
Meta path = FIMPORT => Filter => 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	Y	N	Maxbranch	3	2	SampleMethod	RANDOM	
CVNlter	10		Maxdepth	6		SampleSeed	12345	
CVRepeat	1		MinCatSize	2	5	SampleSize	10000	
CVSeed	12345		MissingValue	USEINSEARCH		ShowNodeId	Y	
ClassColorBy	PERCENTCORRECT		NSubtree	1		ShowValid	Y	
Count	Y		NodeRole	SEGMENT		SigLevel	0.1	0.2
CreateSample	DEFAULT		NodeSample	20000		SplitPrecision	4	
Criterion	DEFAULT		NominalCriterion	ENTROPY	PROBCHISQ	Splitsize	.	
Depth	Y		Nrules	1	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	GINI	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

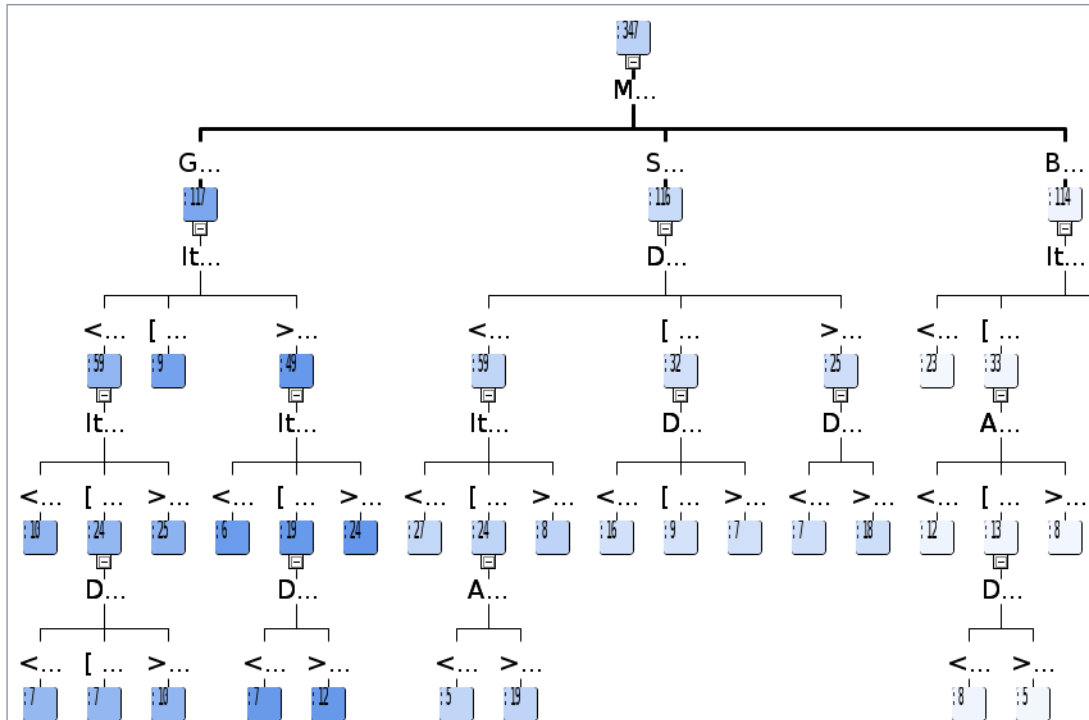
Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Total_Spend
INPUT	INTERVAL	5	Average_Rating Churn_Days_Since_Last_Purchase Discount_Applied Items_Purchased
INPUT	NOMINAL	6	Age_Group City Favorite_Category Gender Membership_Type Satisfaction_Level

Node=Decision Tree Model Fit Statistics

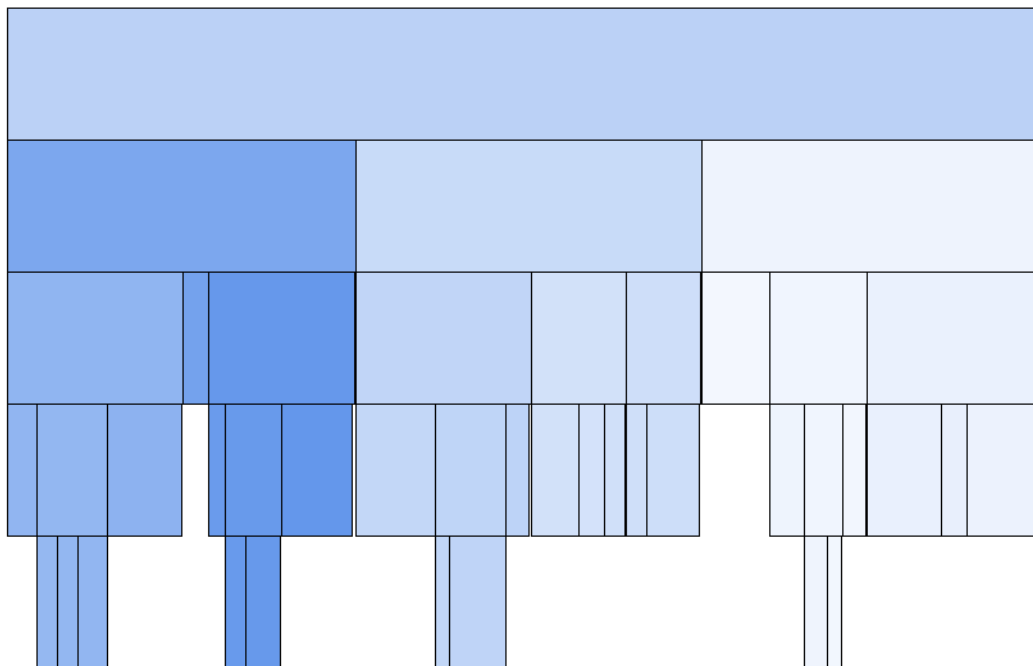
Target=Total_Spend Target Label=Total Spend

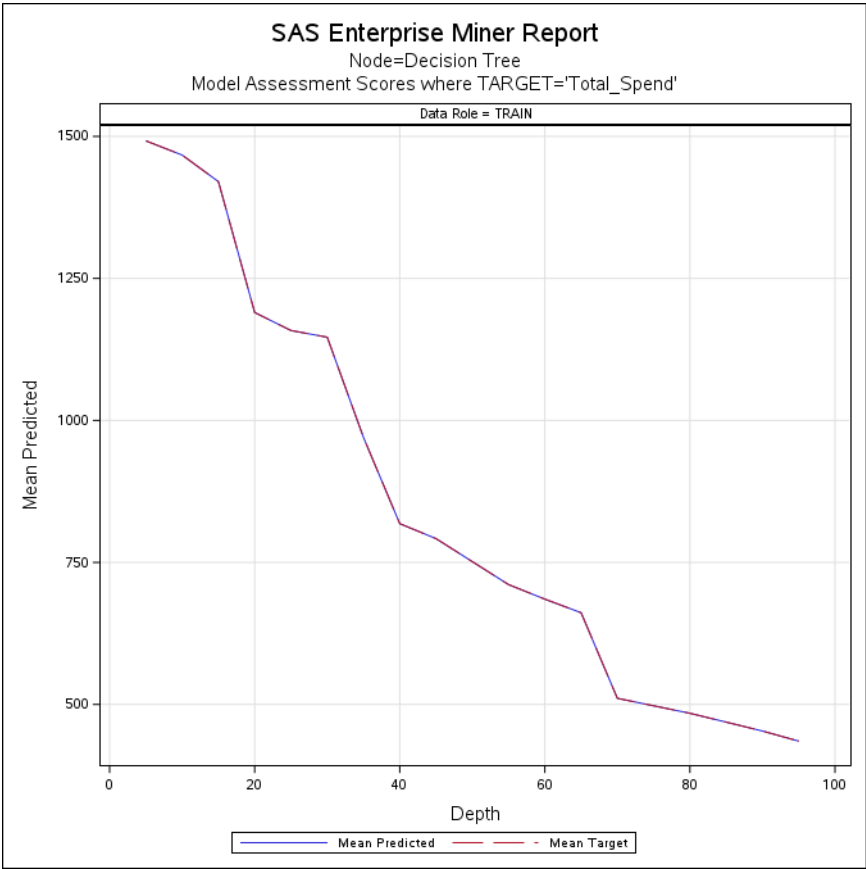
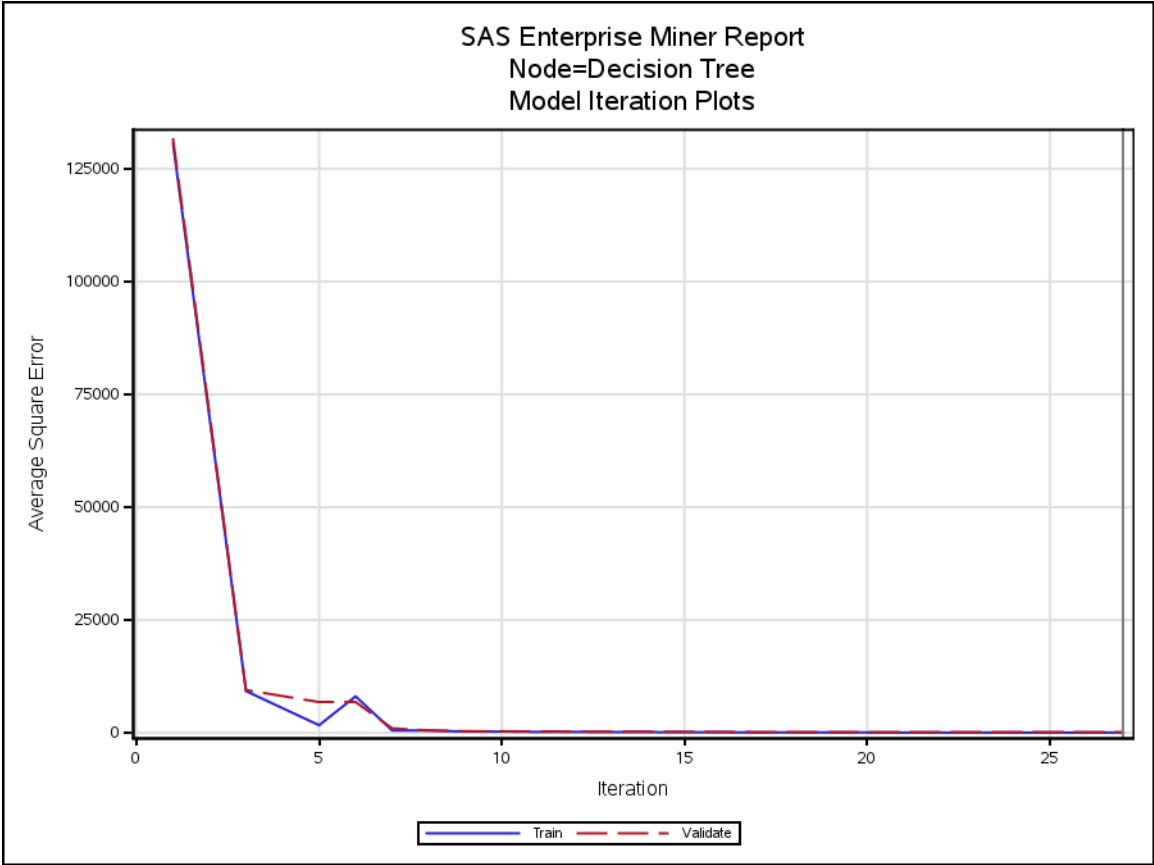
Label of Statistic	Train	Validation	Test
Sum of Frequencies	347.00	.	.
Maximum Absolute Error	38.09	.	.
Sum of Squared Errors	21487.14	.	.
Average Squared Error	61.92	.	.
Root Average Squared Error	7.87	.	.
Divisor for ASE	347.00	.	.
Total Degrees of Freedom	347.00	.	.

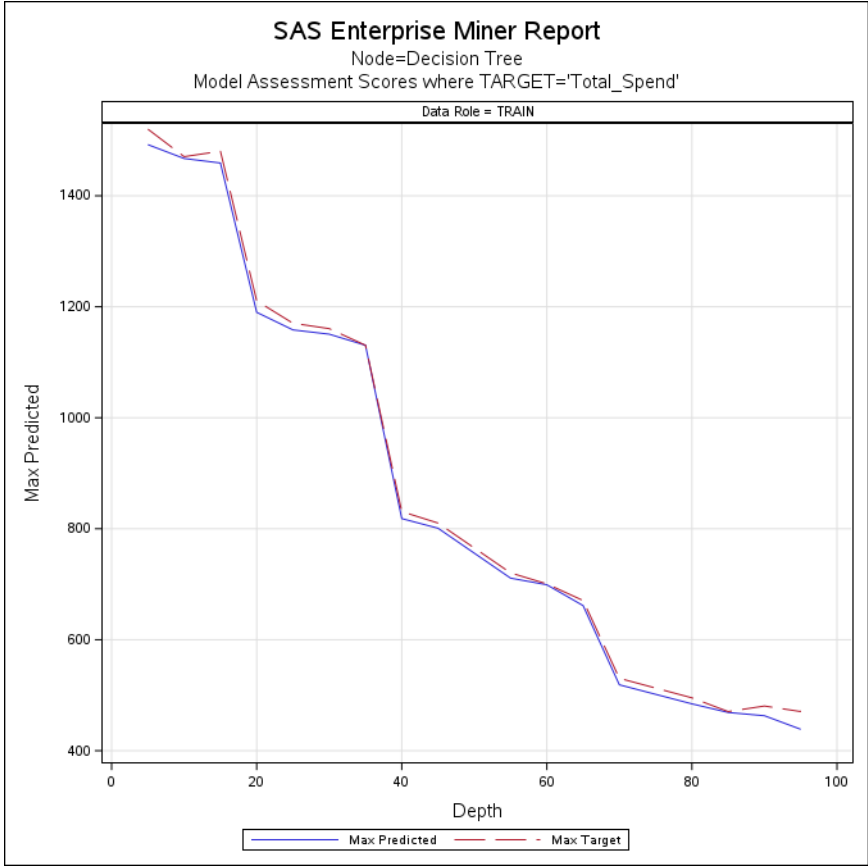
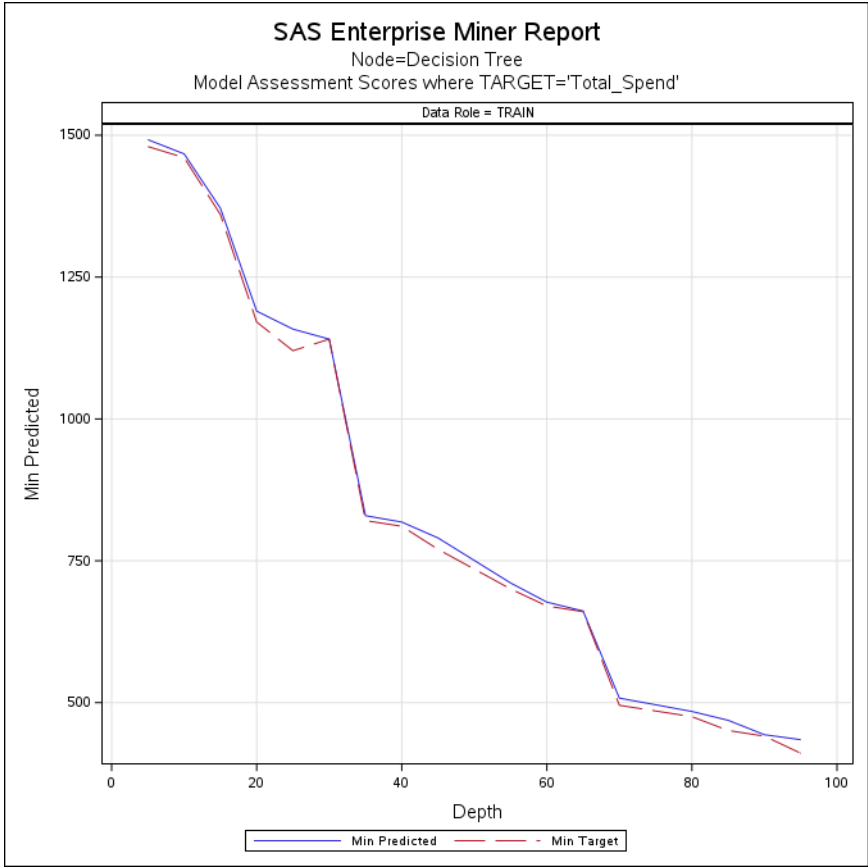
SAS Enterprise Miner Report
Node=Decision Tree
Tree Diagram

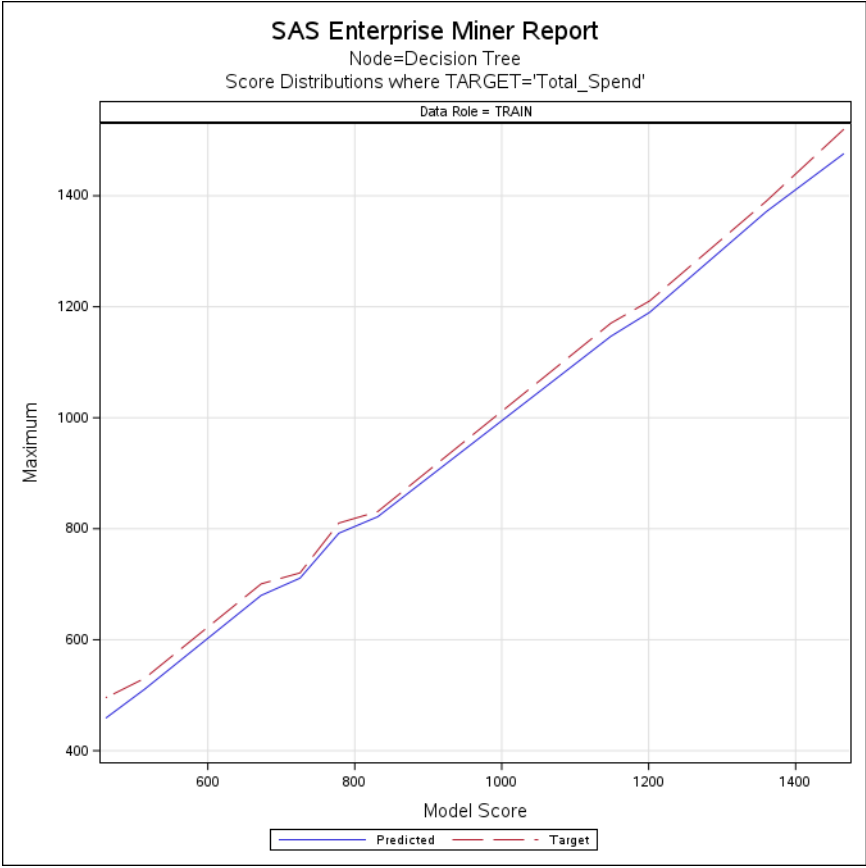
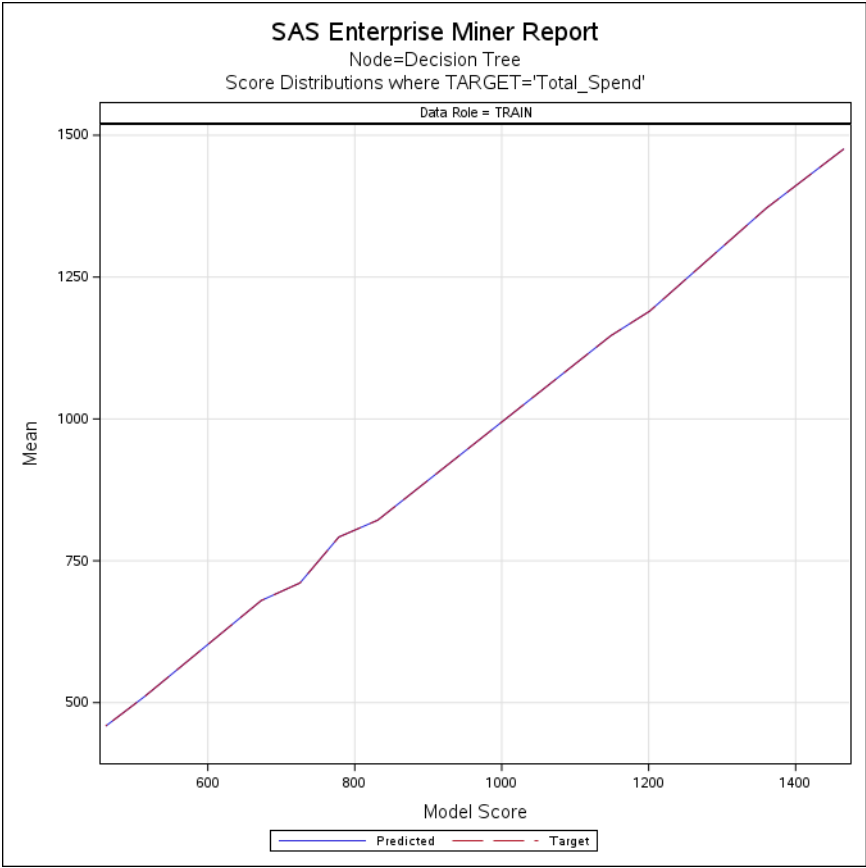


SAS Enterprise Miner Report
Node=Decision Tree
Treemap









Node=Decision Tree
Score Distributions

Target Variable=Total_Spend Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
1439.309 - 1492.183	1476.02	1492.18	1448.85	1476.02	1520.10	1420.80
1333.560 - 1386.434	1371.31	1371.31	1371.31	1371.31	1390.20	1360.20
1174.936 - 1227.810	1189.99	1189.99	1189.99	1189.99	1210.60	1170.80
1122.061 - 1174.936	1146.69	1158.29	1130.60	1146.69	1170.30	1120.20
804.814 - 857.688	821.60	829.50	818.27	821.60	830.90	810.90
751.939 - 804.814	791.90	800.90	790.24	791.90	810.20	770.20
699.064 - 751.939	710.96	710.96	710.96	710.96	720.40	700.40
646.190 - 699.064	679.87	699.00	661.44	679.87	700.60	660.30
487.566 - 540.441	510.80	518.72	507.95	510.80	530.40	495.25
434.691 - 487.566	458.68	484.42	434.69	458.68	495.25	410.80

SAS Enterprise Miner Report

Node=Gradient Boosting Summary

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

Node=Gradient Boosting Properties

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

Node=Gradient Boosting Variable Summary

Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Total_Spend
INPUT	INTERVAL	5	Average_Rating Churn Days_Since_Last_Purchase Discount_Applied Items_Purchased
INPUT	NOMINAL	6	Age_Group City Favorite_Category Gender Membership_Type Satisfaction_Level
ID	INTERVAL	1	Customer_ID

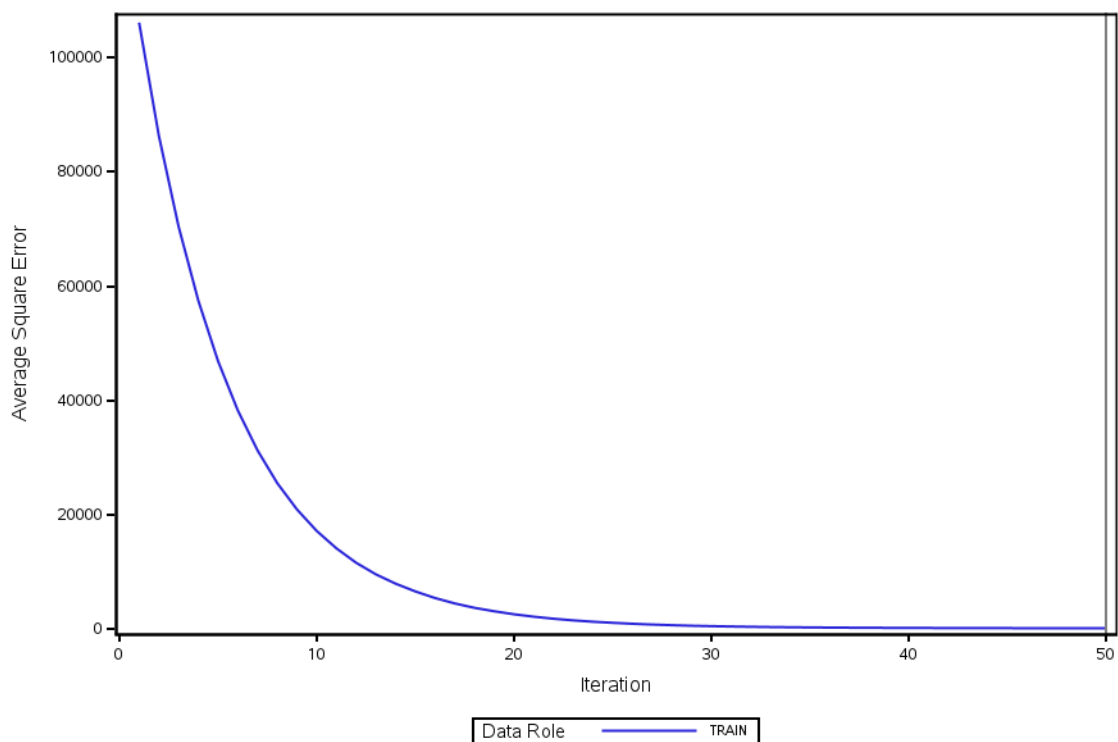
Node=Gradient Boosting Model Fit Statistics

Target=Total_Spend Target Label=Total Spend

Label of Statistic	Train	Validation	Test
Sum of Frequencies	347.00	.	.
Sum of Case Weights Times Freq	347.00	.	.
Maximum Absolute Error	56.27	.	.
Sum of Squared Errors	47359.35	.	.
Average Squared Error	136.48	.	.
Root Average Squared Error	11.68	.	.
Divisor for ASE	347.00	.	.
Total Degrees of Freedom	347.00	.	.

SAS Enterprise Miner Report

Node=Gradient Boosting
Subseries Plot



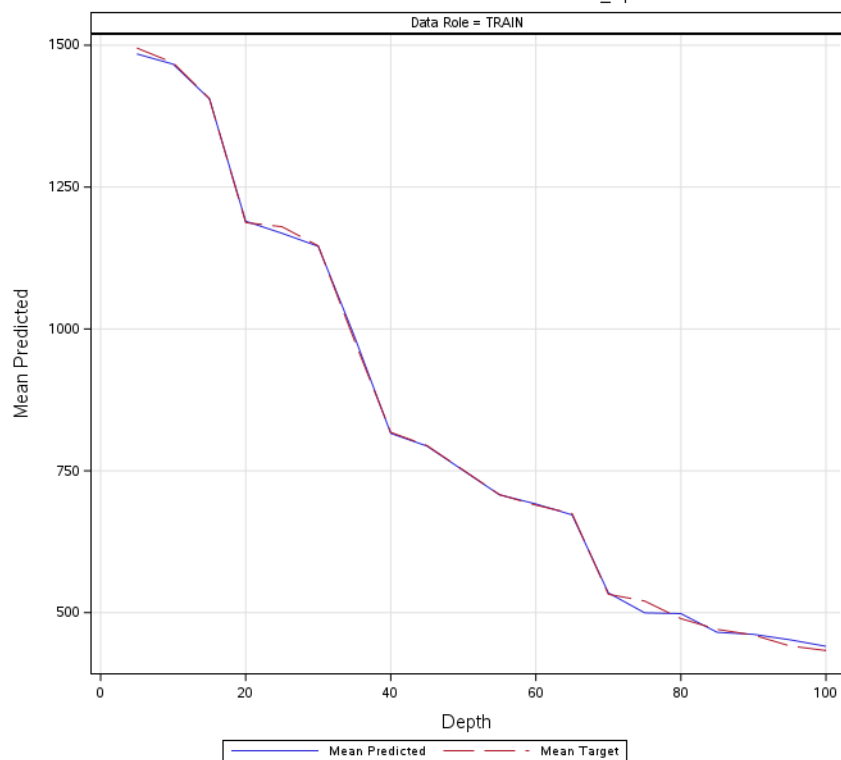
Node=Gradient Boosting Variable Importance

Variable Name	Label	Number of Splitting Rules	Importance
Items_Purchased		67	1.00000
Average_Rating		29	0.47894
Days_Since_Last_Purchase		23	0.24076
City	City	17	0.20836
Satisfaction_Level		6	0.16561
Discount_Applied		3	0.03690
Favorite_Category		4	0.02304
Churn	Churn	1	0.00344
Gender	Gender	0	0.00000
Membership_Type		0	0.00000
Age_Group		0	0.00000

SAS Enterprise Miner Report

Node=Gradient Boosting

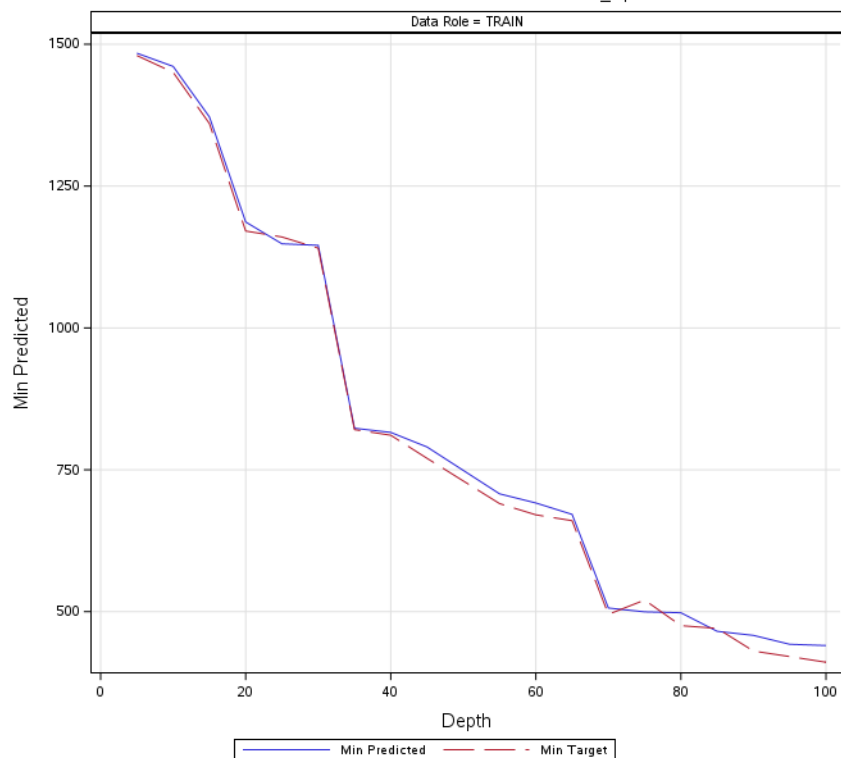
Model Assessment Scores where TARGET='Total_Spend'



SAS Enterprise Miner Report

Node=Gradient Boosting

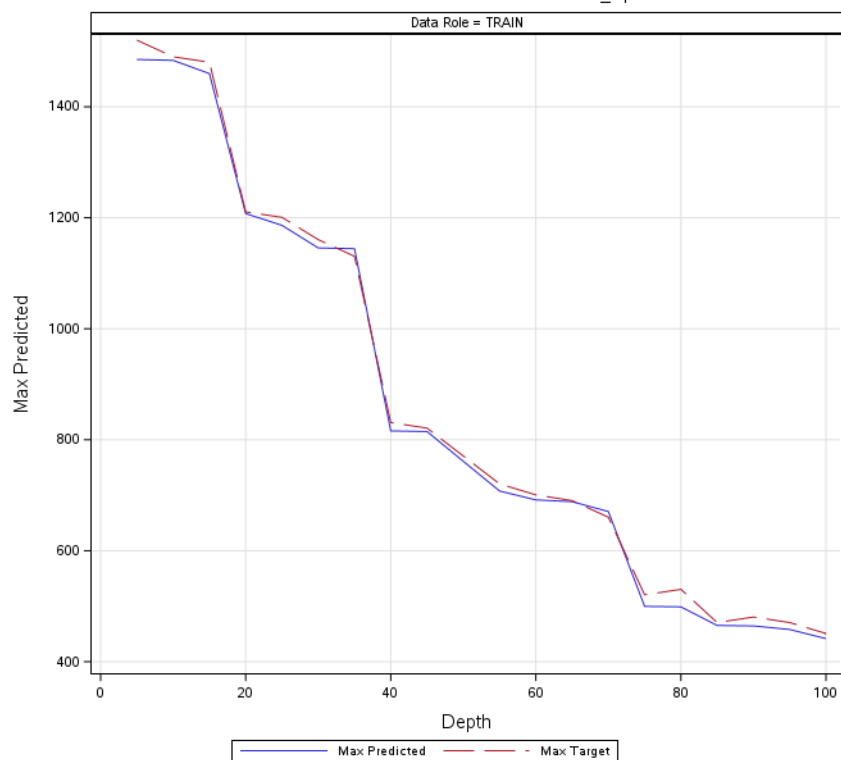
Model Assessment Scores where TARGET='Total_Spend'



SAS Enterprise Miner Report

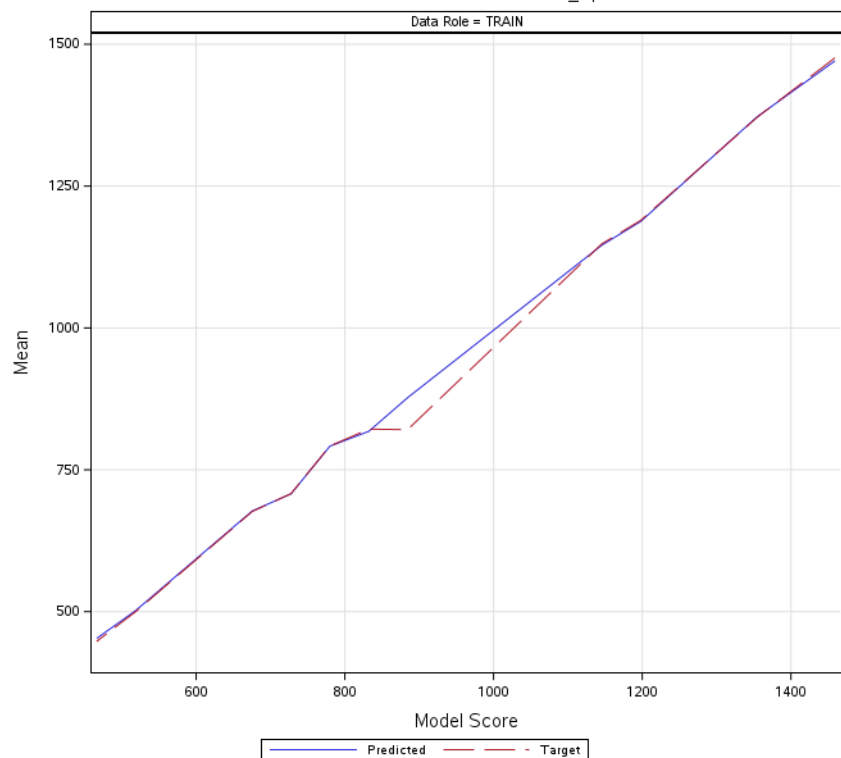
Node=Gradient Boosting

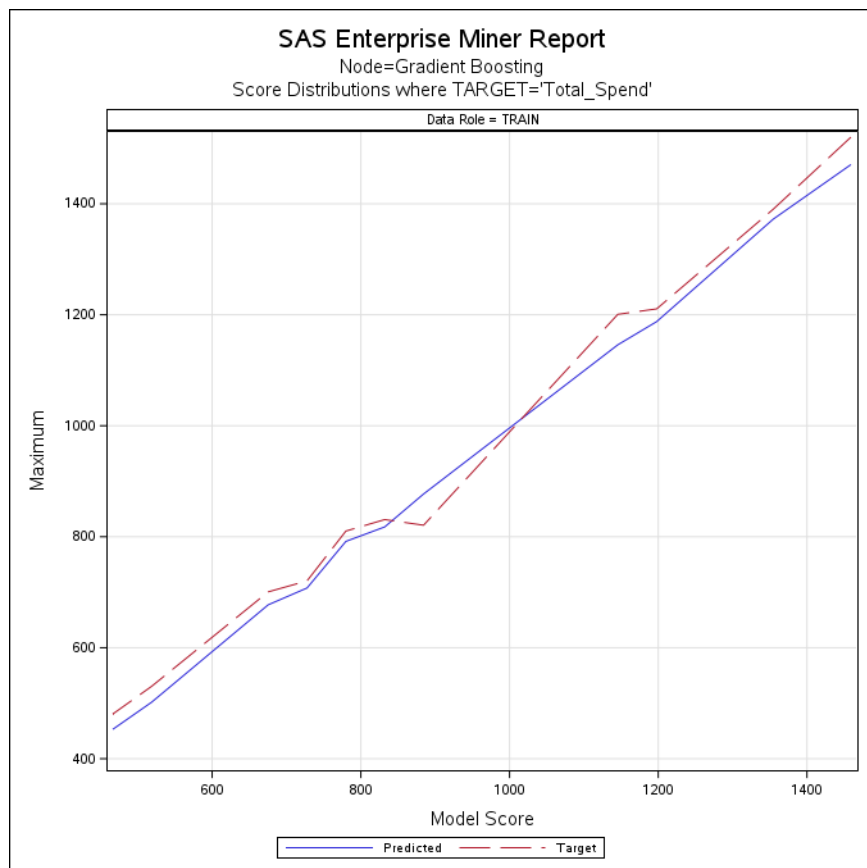
Model Assessment Scores where TARGET='Total_Spend'

**SAS Enterprise Miner Report**

Node=Gradient Boosting

Score Distributions where TARGET='Total_Spend'





Node=Gradient Boosting Score Distributions

Target Variable=Total_Spend Data Role=TRAIN

Range for Predicted	Mean Predicted	Max Predicted	Min Predicted	Mean Target	Max Target	Min Target
1433.032 - 1485.285	1470.62	1485.29	1445.78	1476.02	1520.10	1420.80
1328.526 - 1380.779	1372.31	1374.72	1371.88	1371.31	1390.20	1360.20
1171.767 - 1224.020	1187.66	1207.59	1183.66	1189.54	1210.60	1170.80
1119.514 - 1171.767	1145.87	1148.76	1136.54	1148.23	1200.80	1120.20
858.248 - 910.501	877.02	877.02	877.02	820.75	820.75	820.75
805.995 - 858.248	817.68	823.22	814.08	821.63	830.90	810.90
753.742 - 805.995	791.58	801.37	790.21	791.90	810.20	770.20
701.489 - 753.742	707.59	707.59	707.59	707.90	720.40	690.40
649.236 - 701.489	677.27	691.50	670.59	676.44	700.60	660.30
492.477 - 544.730	501.78	507.99	497.98	499.88	530.40	475.25
440.224 - 492.477	452.87	465.28	440.22	447.65	480.50	410.80

SAS Enterprise Miner Report

Node=Ensemble Summary

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

Node=Ensemble Properties

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

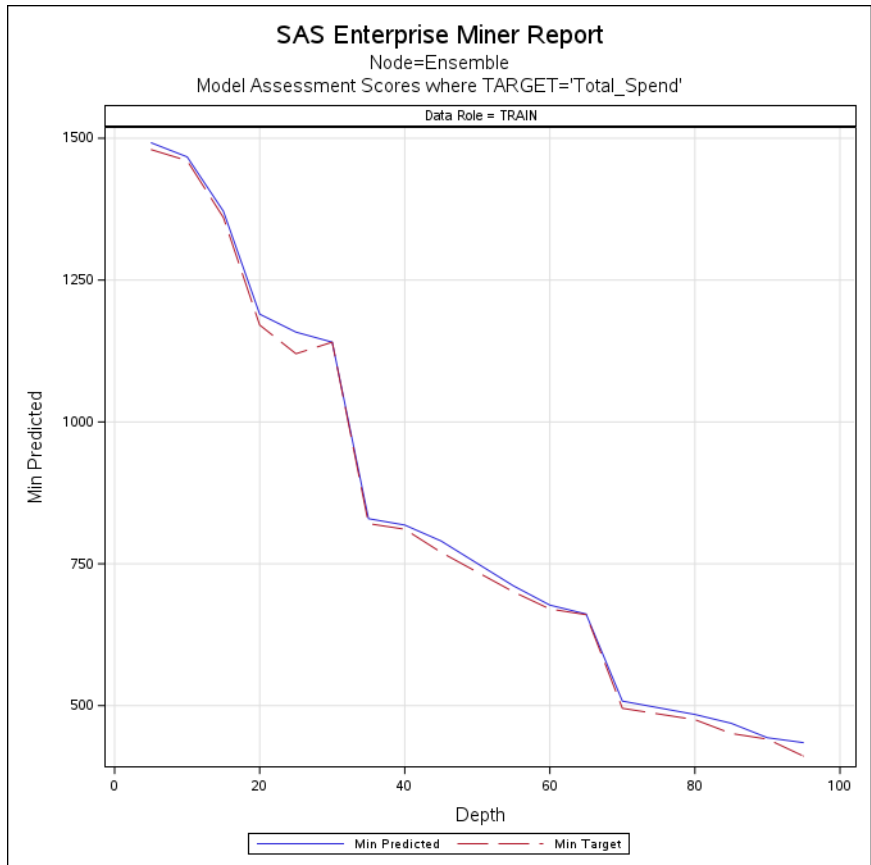
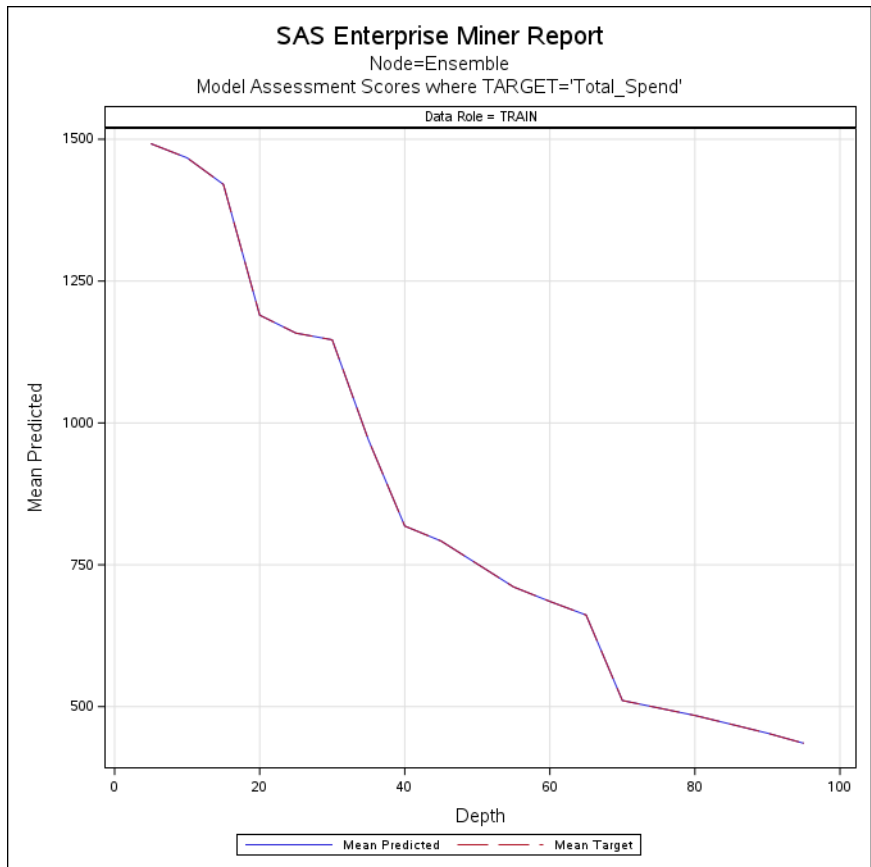
Node=Ensemble Variable Summary

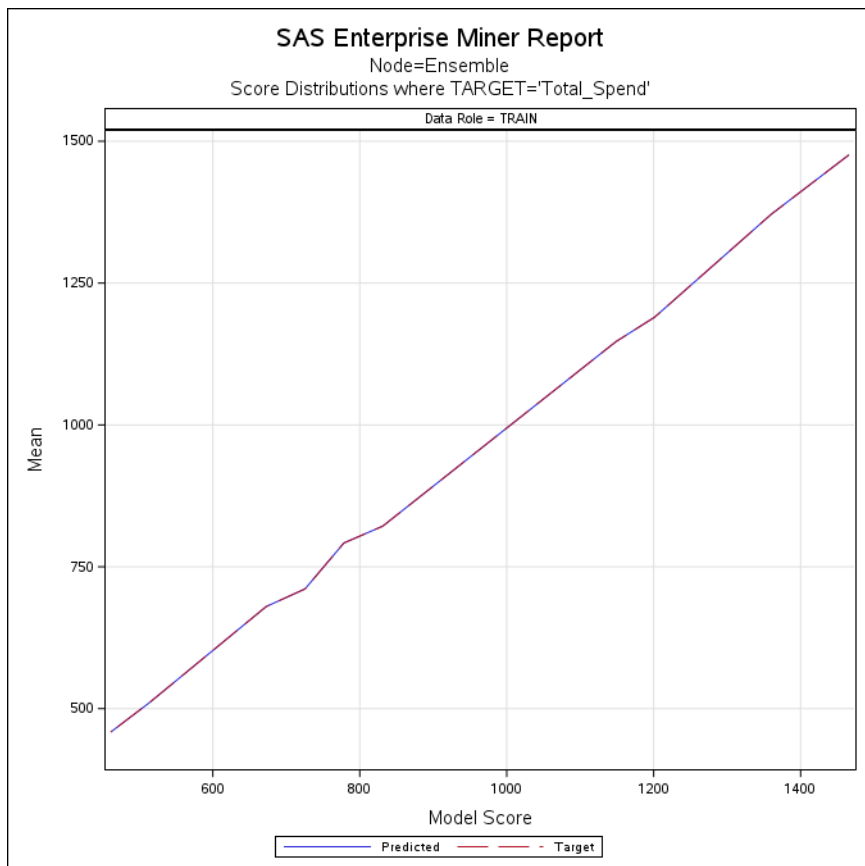
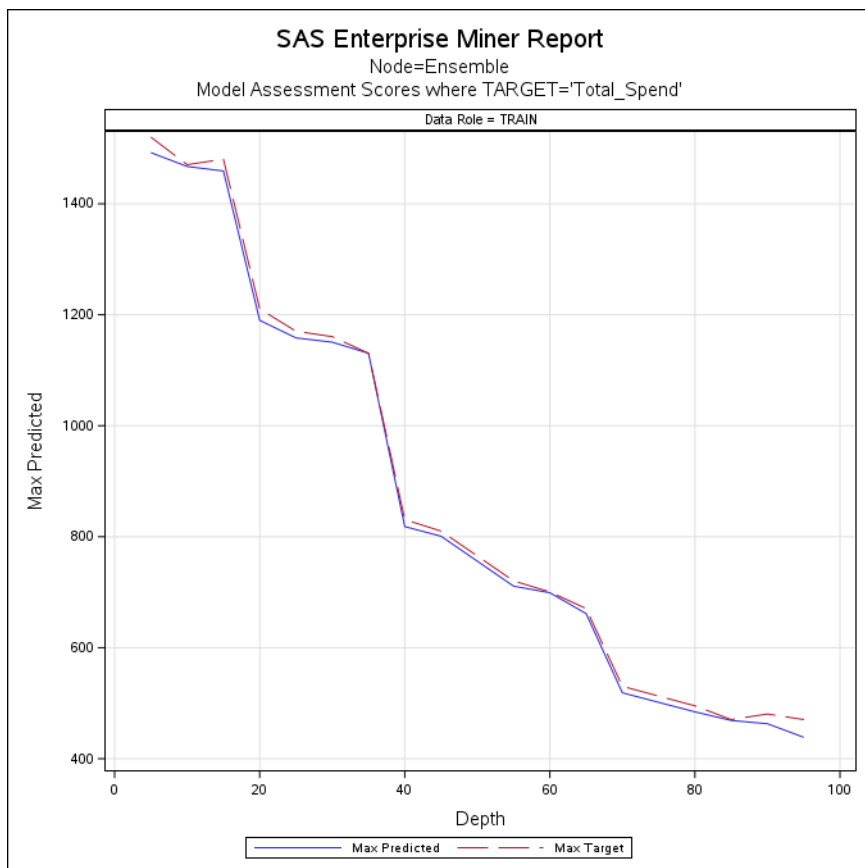
Role	Level	Frequency Count	Name
TARGET	INTERVAL	1	Total_Spend
INPUT	INTERVAL	2	Days_Since_Last_Purchase Items_Purchased
INPUT	NOMINAL	1	Membership_Type

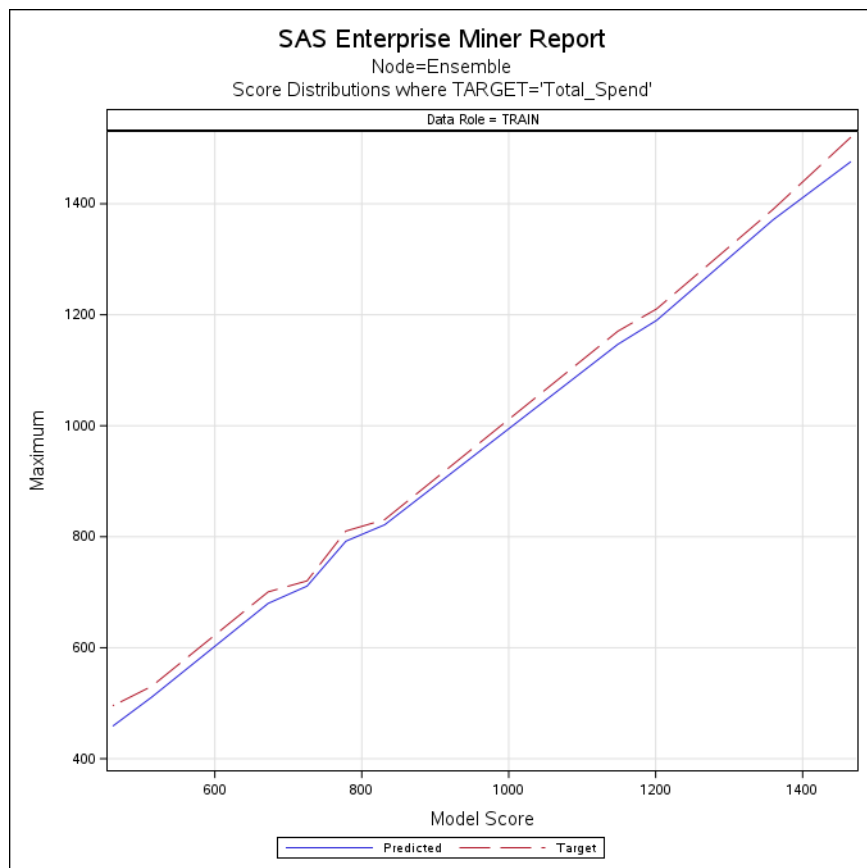
Node=Ensemble Model Fit Statistics

Target=Total_Spend Target Label=Total Spend

Label of Statistic	Train	Validation	Test
Average Squared Error	61.92	.	.
Divisor for ASE	347.00	.	.
Maximum Absolute Error	38.09	.	.
Sum of Frequencies	347.00	.	.
Root Average Squared Error	7.87	.	.
Sum of Squared Errors	21487.14	.	.







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
1439.309 - 1492.183	1476.02	1492.18	1448.85	1476.02	1520.10	1420.80
1333.560 - 1386.434	1371.31	1371.31	1371.31	1371.31	1390.20	1360.20
1174.936 - 1227.810	1189.99	1189.99	1189.99	1189.99	1210.60	1170.80
1122.061 - 1174.936	1146.69	1158.29	1130.60	1146.69	1170.30	1120.20
804.814 - 857.688	821.60	829.50	818.27	821.60	830.90	810.90
751.939 - 804.814	791.90	800.90	790.24	791.90	810.20	770.20
699.064 - 751.939	710.96	710.96	710.96	710.96	720.40	700.40
646.190 - 699.064	679.87	699.00	661.44	679.87	700.60	660.30
487.566 - 540.441	510.80	518.72	507.95	510.80	530.40	495.25
434.691 - 487.566	458.68	484.42	434.69	458.68	495.25	410.80

SAS Enterprise Miner Report

Node=StatExplore Summary

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

Node=StatExplore Properties

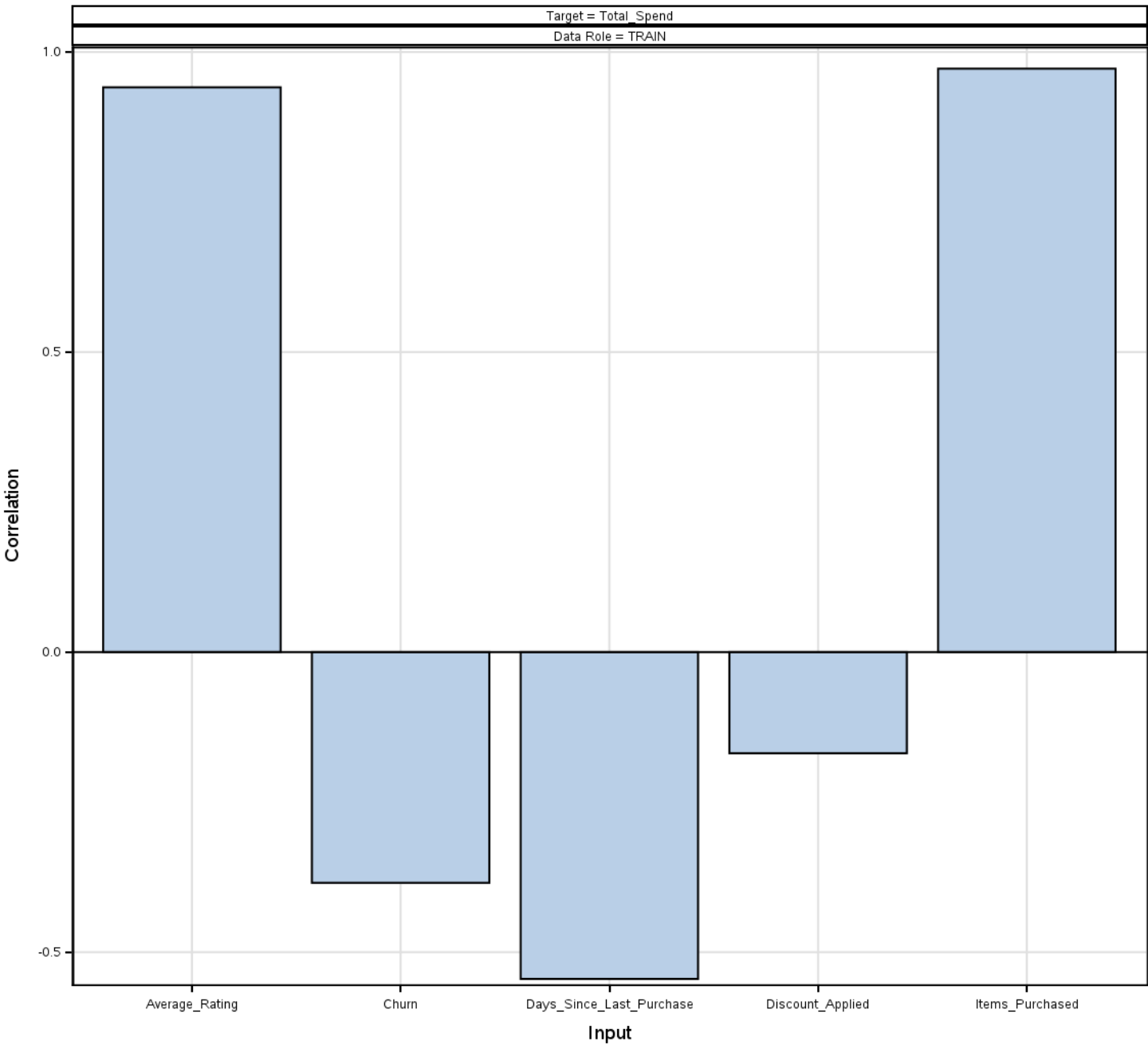
Property	Value	Default	Property	Value	Default	Property	Value	Default
Component	StatExplore		Correlation	Y		NObs	100000	1000000
BySegment	N	Y	DropRejected	Y		Pearson	Y	
ChiSquare	Y		HideVariable	Y		Spearman	N	
ChiSquareInterval	N		IntervalDistribution	Y		UseScore	N	
ChiSquareIntervalNBins	5		LevelSummary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

Node=StatExplore Variable Summary

Role	Level	Frequency Count	Name
INPUT	INTERVAL	5	Average_Rating Churn Days_Since_Last_Purchase Discount_Applied Items_Purchased
INPUT	NOMINAL	6	Age_Group City Favorite_Category Gender Membership_Type Satisfaction_Level

Target	Variable	Importance	Worth	Analysis Variable	Label	plot
Total_Spend	City	1	129631.47	1	City	.
Total_Spend	Items_Purchased	2	127485.05	1	Items Purchased	.
Total_Spend	Average_Rating	3	126200.21	1	Average Rating	.
Total_Spend	Membership_Type	4	121216.98	1	Membership Type	.
Total_Spend	Favorite_Category	5	120616.56	1	Favorite Category	.
Total_Spend	Satisfaction_Level	6	104937.22	1	Satisfaction Level	.
Total_Spend	Days_Since_Last_Purchase	7	72811.06	1	Days Since Last Purchase	.
Total_Spend	Age_Group	8	30443.76	1	Age Group	.
Total_Spend	Gender	9	19584.25	1	Gender	.
Total_Spend	Churn	10	19276.23	1	Churn	.
Total_Spend	Discount_Applied	11	3704.94	1	Discount Applied	.

SAS Enterprise Miner Report
Node=StatExplore
Correlation Plot
CORRTYPE='PEARSON'

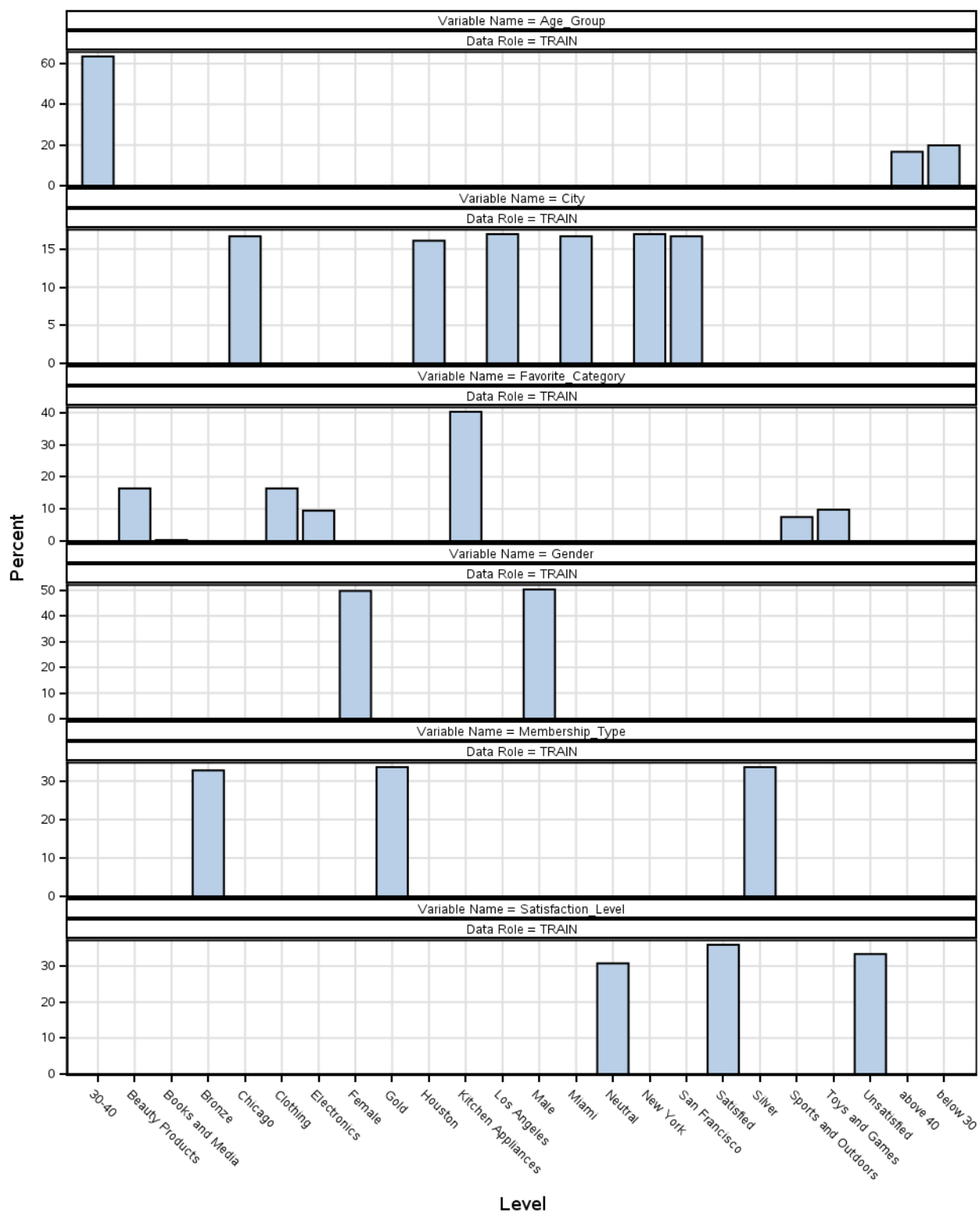


SAS Enterprise Miner Report

Node=StatExplore

Class Variables

PLOT=1



SAS Enterprise Miner Report
Node=StatExplore
Interval Variables

