

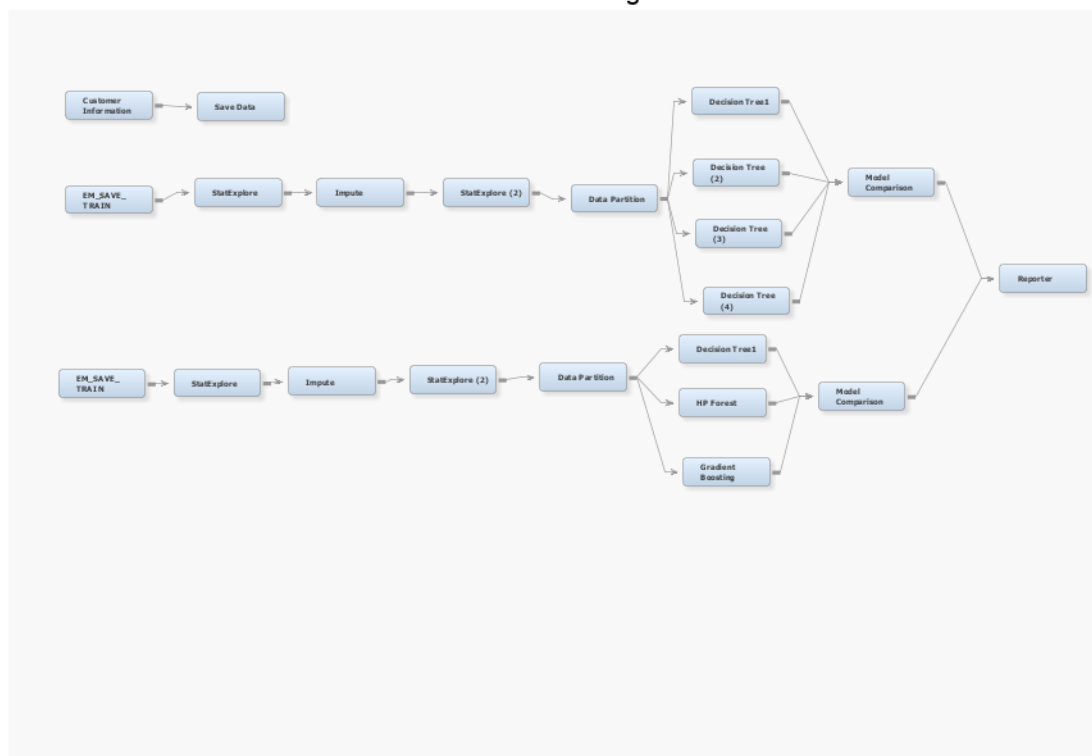
SAS Enterprise Miner Report

User = HP
Date = 15:02:41 o'clock 08 January 2024
Project = E-Commerce Customer Behaviour Analysis
Diagram = E-Commerce Customer Behaviour Analysis

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

Format = PDF
Style = LISTING

SAS Enterprise Miner Report Process Flow Diagram



SAS Enterprise Miner Report

Node=EM_SAVE_TRAIN
Summary

Node id = Ids2
Node label = EM_SAVE_TRAIN
Meta path = Ids2
Notes =

Node=EM_SAVE_TRAIN
Properties

| Property | Value | Default | Property | Value | Default | Property | Value | Default |
|------------------------------|---------------------|---------|----------------------|--------------|---------|-------------------|---------------|---------|
| Component | DataSource | | DsCreatedBy | HP | | NBytes | 132096 | . |
| ApplyIntervalLevelLowerLimit | Y | | DsId | emsavetrain | | NCols | 11 | . |
| ApplyMaxClassLevels | Y | | DsModifiedBy | HP | | NObs | 1000 | . |
| ApplyMaxPercentMissing | Y | | DsModifyDate | 2020262872.9 | | NewTable | | |
| CMeta | WORK.M3SZVODY | | DsSampleName | | | NewVariableRole | REJECT | |
| ComputeStatistics | N | | DsSampleSize | | | OutputType | VIEW | |
| DBPassThrough | Y | | DsSampleSizeType | | | Role | RAW | TRAIN |
| Data | AAEM2.EM_SAVE_TRAIN | | DsScope | LOCAL | | Sample | D | |
| DataSelection | DATASOURCE | | IdentifyEmptyColumns | Y | | SampleSizeObs | 10000 | |
| DataSource | emsavetrain | | IntervalLowerLimit | 20 | | SampleSizePercent | 20 | |
| DataSourceRole | RAW | | Library | AAEM2 | | SampleSizeType | PERCENT | |
| Description | | | MaxClassLevels | 20 | | Scope | LOCAL | |
| DropMapVariables | Y | | MaxPercentMissing | 50 | | Segment | | |
| DsCreateDate | 2020262872.8 | | MetaAdvisor | BASIC | | Table | EM_SAVE_TRAIN | |

Node=EM_SAVE_TRAIN
Data Attributes

| Attribute | Value | Attribute | Value | Attribute | Value |
|------------|---------------|----------------|---------------------|--------------|--------|
| Data Name | EM_SAVE_TRAIN | Date Created | 07/01/2024 19:20:45 | Data Size | 132096 |
| Data Type | DATA | Date Modified | 07/01/2024 19:20:45 | Role | RAW |
| Data Label | | Number Rows | 1000 | Segment | |
| Engine | BASE | Number Columns | 11 | Data Library | AAEM2 |

Node=EM_SAVE_TRAIN
Variables List

| Name | Label | Role | Level | Type | Length | Format | Creator |
|------------------|-------|--------|----------|------|--------|----------|---------|
| Age | | INPUT | INTERVAL | N | 8 | BEST12.0 | |
| Churn | | TARGET | BINARY | N | 8 | BEST12.0 | |
| CustomerID | | ID | NOMINAL | N | 8 | BEST12.0 | |
| FavoriteCategory | | INPUT | NOMINAL | C | 11 | \$11. | |
| Gender | | INPUT | NOMINAL | C | 6 | \$6. | |
| Location | | INPUT | NOMINAL | C | 9 | \$9. | |
| MembershipLevel | | INPUT | NOMINAL | C | 8 | \$8. | |
| Occupation | | INPUT | NOMINAL | C | 13 | \$13. | |
| TotalPurchases | | INPUT | INTERVAL | N | 8 | BEST12.0 | |
| TotalSpent | | INPUT | INTERVAL | N | 8 | BEST12.0 | |
| WebsiteVisits | | INPUT | INTERVAL | N | 8 | BEST12.0 | |

SAS Enterprise Miner Report

Node=StatExplore
Summary

Node id = Stat3
Node label = StatExplore
Meta path = Ids2 => Stat3
Notes =

Node=StatExplore
Properties

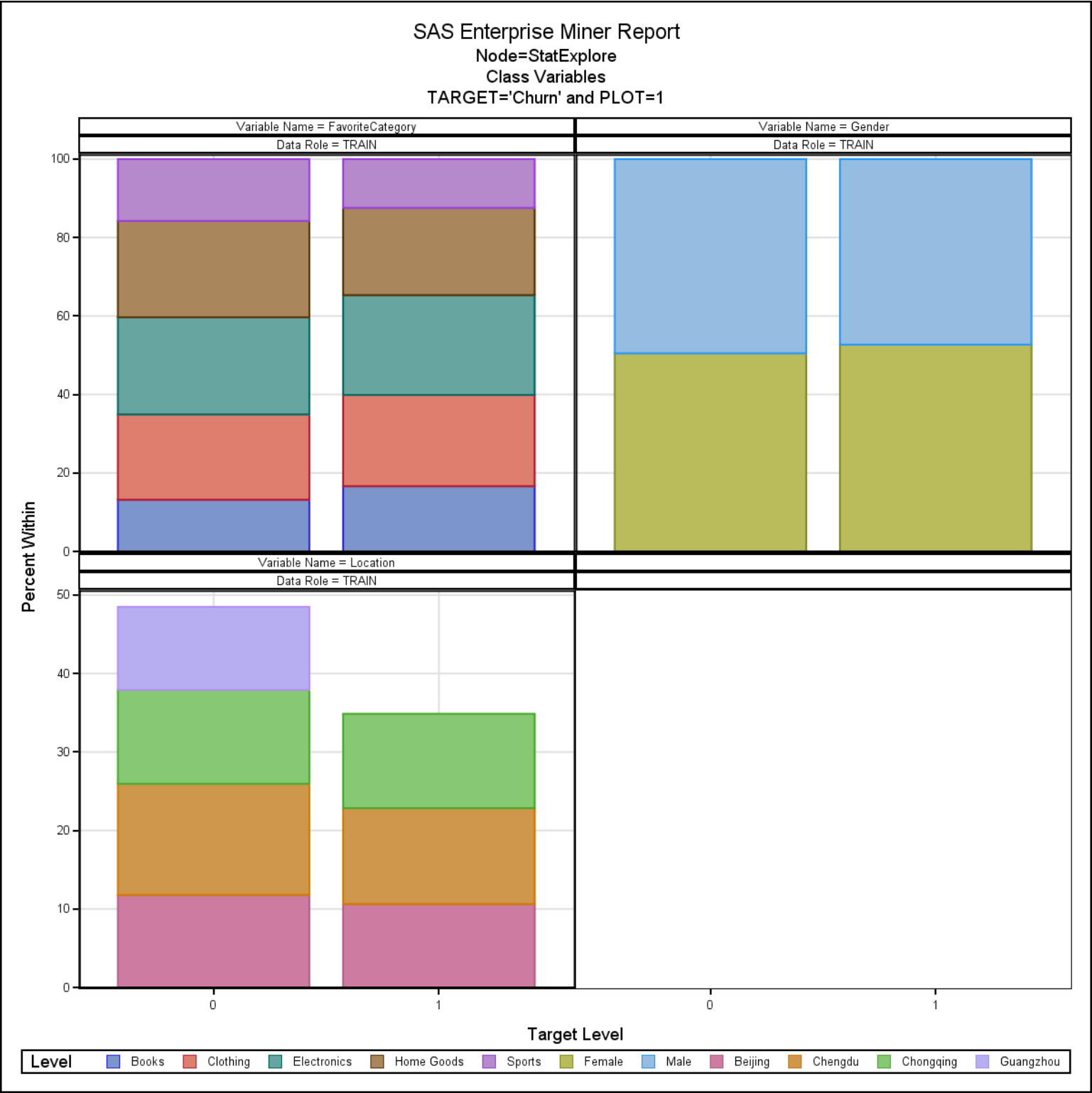
| Property | Value | Default | Property | Value | Default | Property | Value | Default |
|------------------------|-------------|---------|----------------------|-------|---------|-------------|--------|---------|
| Component | StatExplore | | Correlation | Y | | NObs | 100000 | 1000000 |
| BySegment | 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 | 4 | Age TotalPurchases TotalSpent WebsiteVisits |
| INPUT | NOMINAL | 5 | FavoriteCategory Gender Location MembershipLevel Occupation |

| Target | Variable | Importance | Worth | Analysis Variable | Label | plot |
|--------|------------------|------------|----------|----------------------|------------------|------|
| Churn | TotalSpent | 1 | 0.012734 | 1 | TotalSpent | . |
| Churn | TotalPurchases | 2 | 0.007780 | 1 | TotalPurchases | . |
| Churn | Age | 3 | 0.007133 | 1 | Age | . |
| Churn | WebsiteVisits | 4 | 0.006525 | 1 | WebsiteVisits | . |
| Churn | Location | 5 | 0.002921 | 1 | Location | . |
| Churn | FavoriteCategory | 6 | 0.002427 | 1 | FavoriteCategory | . |
| Churn | Occupation | 7 | 0.000263 | 1 | Occupation | . |
| Churn | MembershipLevel | 8 | 0.000262 | 1 | MembershipLevel | . |
| Churn | Gender | 9 | 0.000244 | 1 | Gender | . |

| Data Role | Segment | Segment Id | Segment Name:Value | Target | Input | Cramer's V | Prob | Chi-Square | Df | Role | Label | Ordered Inputs | Group | Plot |
|--------------|---------|---------------|-----------------------|--------|------------------|---------------|--------|------------|----|-------|------------------|-------------------|-------|------|
| TRAIN | | | _OVERALL_ | Churn | Location | 0.077212 | 0.5442 | 5.9618 | 7 | INPUT | Location | 1 | 1 | 1 |
| TRAIN | | | _OVERALL_ | Churn | FavoriteCategory | 0.069673 | 0.3026 | 4.8543 | 4 | INPUT | FavoriteCategory | 2 | 2 | 1 |
| TRAIN | | | _OVERALL_ | Churn | Occupation | 0.022952 | 0.9130 | 0.5268 | 3 | INPUT | Occupation | 3 | 3 | 1 |
| TRAIN | | | _OVERALL_ | Churn | MembershipLevel | 0.022880 | 0.9137 | 0.5235 | 3 | INPUT | MembershipLevel | 4 | 4 | 1 |
| TRAIN | | | _OVERALL_ | Churn | Gender | 0.022075 | 0.4851 | 0.4873 | 1 | INPUT | Gender | 5 | 5 | 1 |



SAS Enterprise Miner Report

Node=Impute
Summary

Node id = Impt2
Node label = Impute
Meta path = Ids2 => Stat3 => Impt2
Notes =

Node=Impute
Properties

| Property | Value | Default | Property | Value | Default | Property | Value | Default |
|---------------------|--------------|---------|----------------------|----------|---------|---------------------|-------|---------|
| Component | Impute | | IndicatorRole | REJECTED | | MinCatSize | 5 | |
| ABWTuning | 9 | | IndicatorSource | IMPUTED | | Normalize | Y | |
| AHUBERTuning | 1.5 | | LeafSize | 5 | | Nrules | 5 | |
| AWAVETuning | 6.2831853072 | | MaxPctMissing | 50 | | Nsurrs | 2 | |
| DefaultChar | | | Maxbranch | 2 | | RandomSeed | 12345 | |
| DefaultNum | . | | Maxdepth | 6 | | ReplaceVariable | N | |
| DistributionMissing | N | | MethodClass | COUNT | | SpacingProportion | 90 | |
| HideVariable | Y | | MethodInterval | MEDIAN | MEAN | Splitsize | . | |
| ImputeNoMissing | N | | MethodTargetClass | NONE | | ValidateTestMissing | N | |
| Indicator | NONE | | MethodTargetInterval | NONE | | | | |

Node=Impute
Variable Summary

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

Node=Impute
Imputation Summary

| Variable Name | Impute Method | Imputed Variable | Impute Value | Role | Measurement Level | Label | Number of Missing for TRAIN |
|----------------|------------------|--------------------|--------------|-------|----------------------|-------|-----------------------------------|
| TotalPurchases | MEDIAN | IMP_TotalPurchases | 40 | INPUT | INTERVAL | | 17 |
| TotalSpent | MEDIAN | IMP_TotalSpent | 4039 | INPUT | INTERVAL | | 39 |

SAS Enterprise Miner Report

Node=StatExplore (2)
Summary

Node id = Stat4
Node label = StatExplore (2)
Meta path = Ids2 => Stat3 => Impt2 => Stat4
Notes =

Node=StatExplore (2)
Properties

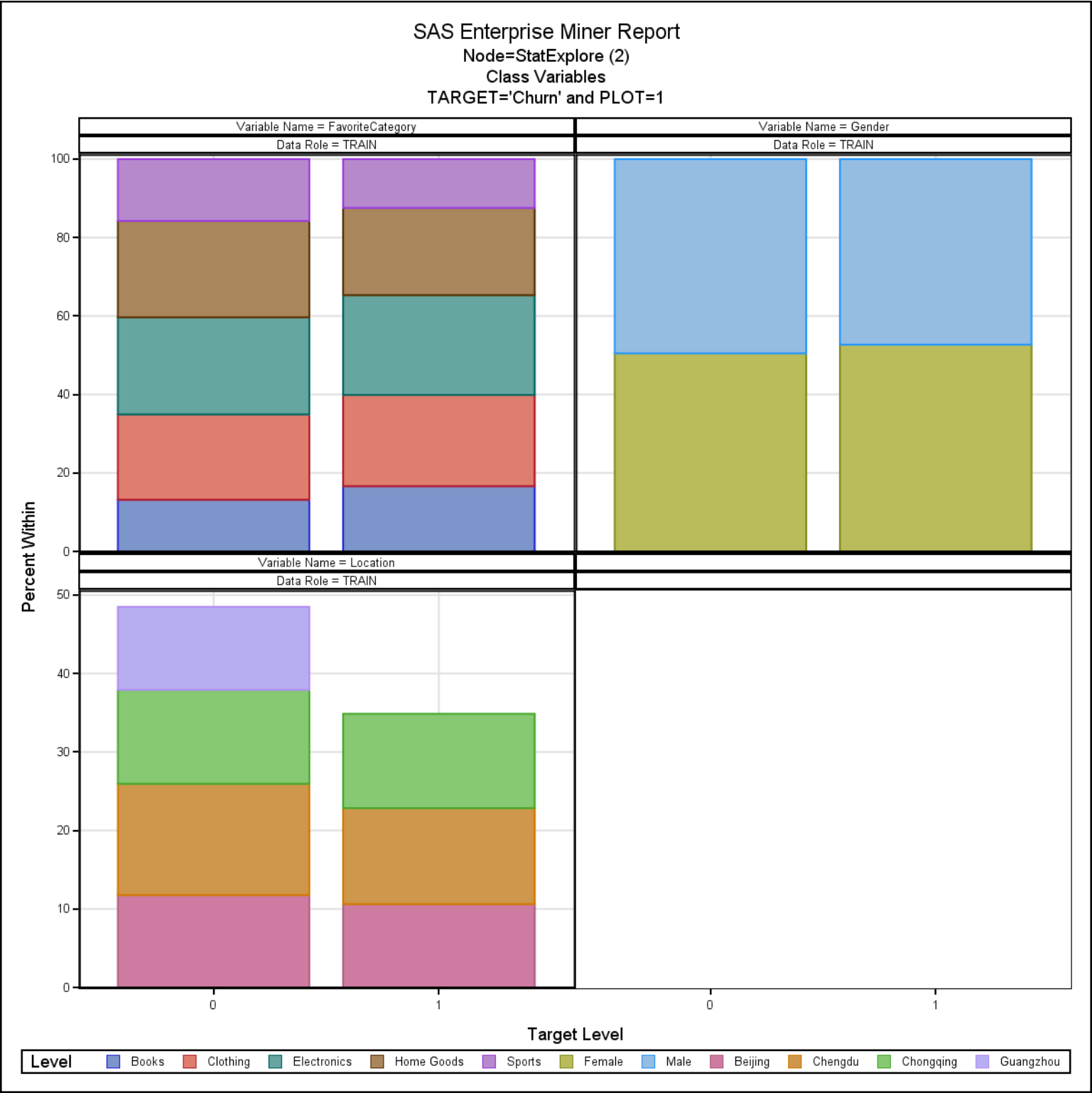
| Property | Value | Default | Property | Value | Default | Property | Value | Default |
|------------------------|-------------|---------|----------------------|-------|---------|-------------|--------|---------|
| Component | StatExplore | | Correlation | Y | | NObs | 100000 | 1000000 |
| BySegment | 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 | INTERVAL | 4 | Age IMP_TotalPurchases IMP_TotalSpent WebsiteVisits |
| INPUT | NOMINAL | 5 | FavoriteCategory Gender Location MembershipLevel Occupation |

| Target | Variable | Importance | Worth | Analysis Variable | Label | plot |
|--------|--------------------|------------|----------|-------------------|------------------------|------|
| Churn | IMP_TotalSpent | 1 | 0.012734 | 1 | Imputed TotalSpent | . |
| Churn | IMP_TotalPurchases | 2 | 0.008815 | 1 | Imputed TotalPurchases | . |
| Churn | Age | 3 | 0.007133 | 1 | Age | . |
| Churn | WebsiteVisits | 4 | 0.006525 | 1 | WebsiteVisits | . |
| Churn | Location | 5 | 0.002921 | 1 | Location | . |
| Churn | FavoriteCategory | 6 | 0.002427 | 1 | FavoriteCategory | . |
| Churn | Occupation | 7 | 0.000263 | 1 | Occupation | . |
| Churn | MembershipLevel | 8 | 0.000262 | 1 | MembershipLevel | . |
| Churn | Gender | 9 | 0.000244 | 1 | Gender | . |

| Data Role | Segment | Segment Id | Segment Name:Value | Target | Input | Cramer's V | Prob | Chi-Square | Df | Role | Label | Ordered Inputs | Group | Plot |
|-----------|---------|------------|--------------------|--------|------------------|------------|--------|------------|----|-------|------------------|----------------|-------|------|
| TRAIN | | | _OVERALL_ | Churn | Location | 0.077212 | 0.5442 | 5.9618 | 7 | INPUT | Location | 1 | 1 | 1 |
| TRAIN | | | _OVERALL_ | Churn | FavoriteCategory | 0.069673 | 0.3026 | 4.8543 | 4 | INPUT | FavoriteCategory | 2 | 2 | 1 |
| TRAIN | | | _OVERALL_ | Churn | Occupation | 0.022952 | 0.9130 | 0.5268 | 3 | INPUT | Occupation | 3 | 3 | 1 |
| TRAIN | | | _OVERALL_ | Churn | MembershipLevel | 0.022880 | 0.9137 | 0.5235 | 3 | INPUT | MembershipLevel | 4 | 4 | 1 |
| TRAIN | | | _OVERALL_ | Churn | Gender | 0.022075 | 0.4851 | 0.4873 | 1 | INPUT | Gender | 5 | 5 | 1 |



SAS Enterprise Miner Report

Node=Data Partition Summary

Node id = Part2
 Node label = Data Partition
 Meta path = Ids2 => Stat3 => Impt2 => Stat4 => Part2
 Notes =

Node=Data Partition Properties

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

Node=Data Partition Variable Summary

| Role | Level | Frequency Count | Name |
|--------|----------|--------------------|---|
| TARGET | BINARY | 1 | Churn |
| INPUT | INTERVAL | 4 | Age IMP_TotalPurchases IMP_TotalSpent WebsiteVisits |
| INPUT | NOMINAL | 5 | FavoriteCategory Gender Location MembershipLevel Occupation |
| ID | NOMINAL | 1 | CustomerID |

SAS Enterprise Miner Report

Node=Decision Tree1
Summary

Node id = Tree5
Node label = Decision Tree1
Meta path = Ids2 => Stat3 => Impt2 => Stat4 => Part2 => Tree5
Notes =

Node=Decision Tree1
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 Tree1
Variable Summary

| Role | Level | Frequency Count | Name |
|--------|----------|-----------------|---|
| TARGET | BINARY | 1 | Churn |
| INPUT | INTERVAL | 4 | Age IMP_TotalPurchases IMP_TotalSpent WebsiteVisits |
| INPUT | NOMINAL | 5 | FavoriteCategory Gender Location MembershipLevel Occupation |
| ID | INTERVAL | 1 | _dataobs_ |
| ID | NOMINAL | 1 | CustomerID |

Node=Decision Tree1
Model Fit Statistics

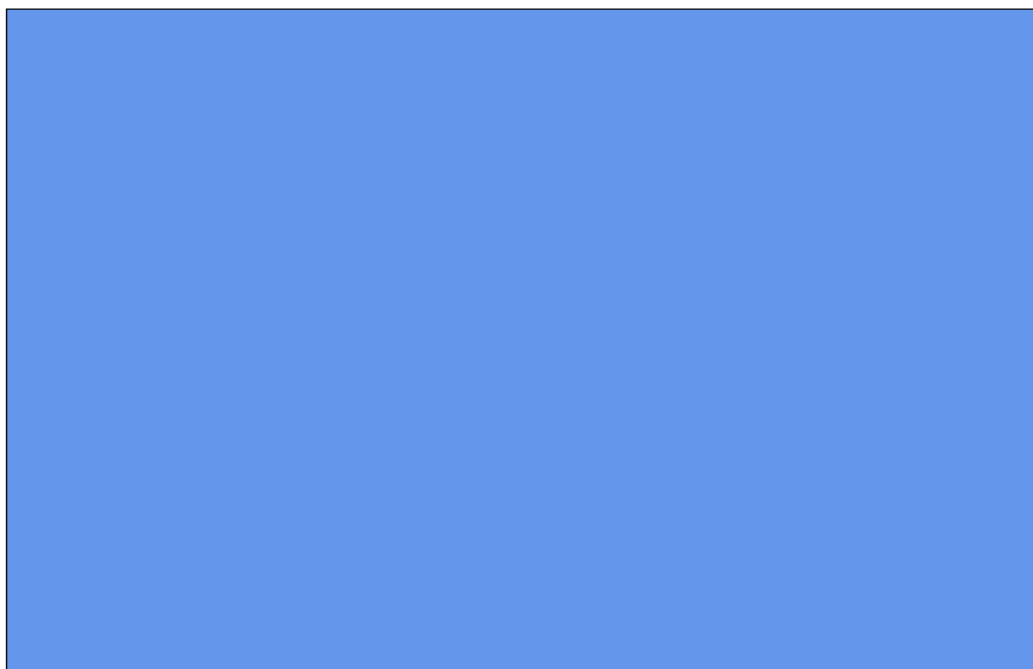
Target=Churn Target Label=' '

| Label of Statistic | Train | Validation | Test |
|----------------------------|---------|------------|---------|
| Sum of Frequencies | 700.00 | 149.000 | 151.000 |
| Misclassification Rate | 0.50 | 0.497 | 0.503 |
| Maximum Absolute Error | 0.50 | 0.501 | 0.501 |
| Sum of Squared Errors | 350.00 | 74.498 | 75.503 |
| Average Squared Error | 0.25 | 0.250 | 0.250 |
| Root Average Squared Error | 0.50 | 0.500 | 0.500 |
| Divisor for ASE | 1400.00 | 298.000 | 302.000 |
| Total Degrees of Freedom | 700.00 | . | . |

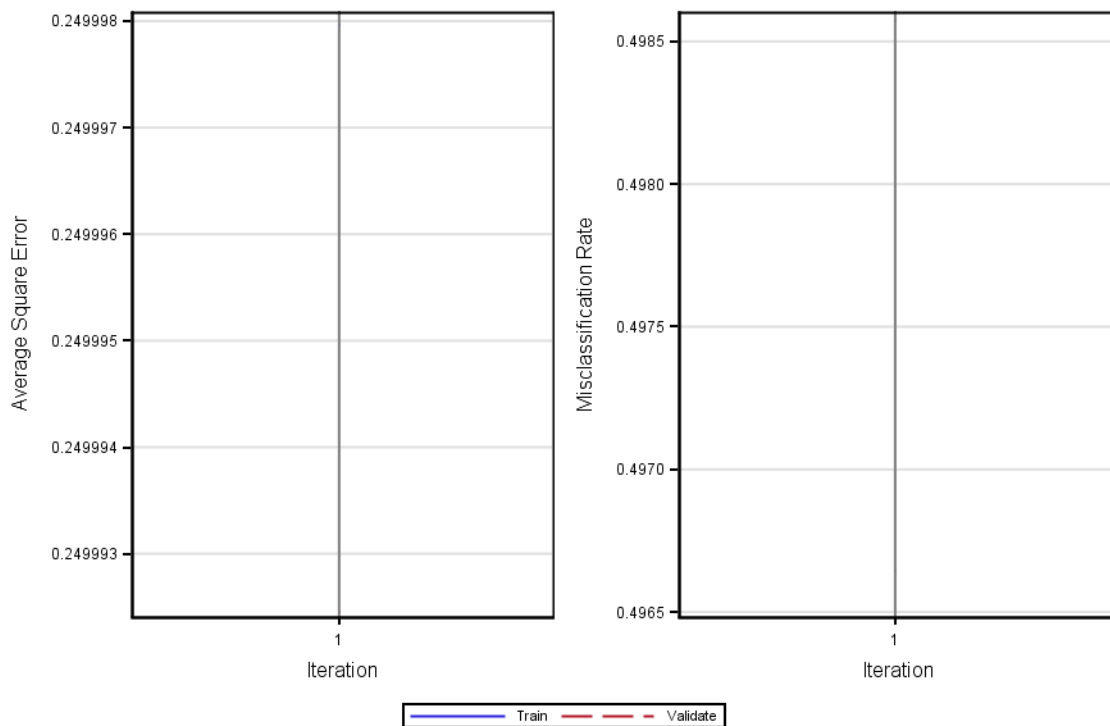
SAS Enterprise Miner Report
Node=Decision Tree1
Tree Diagram

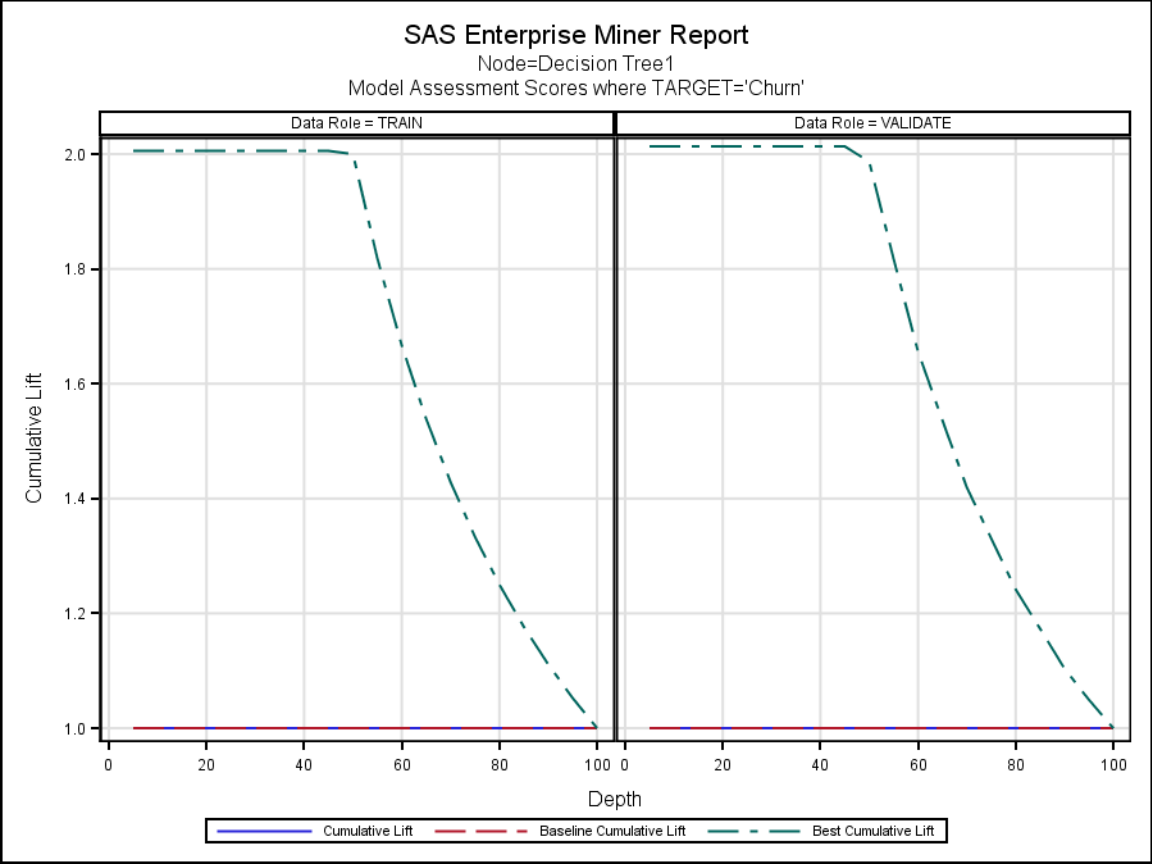
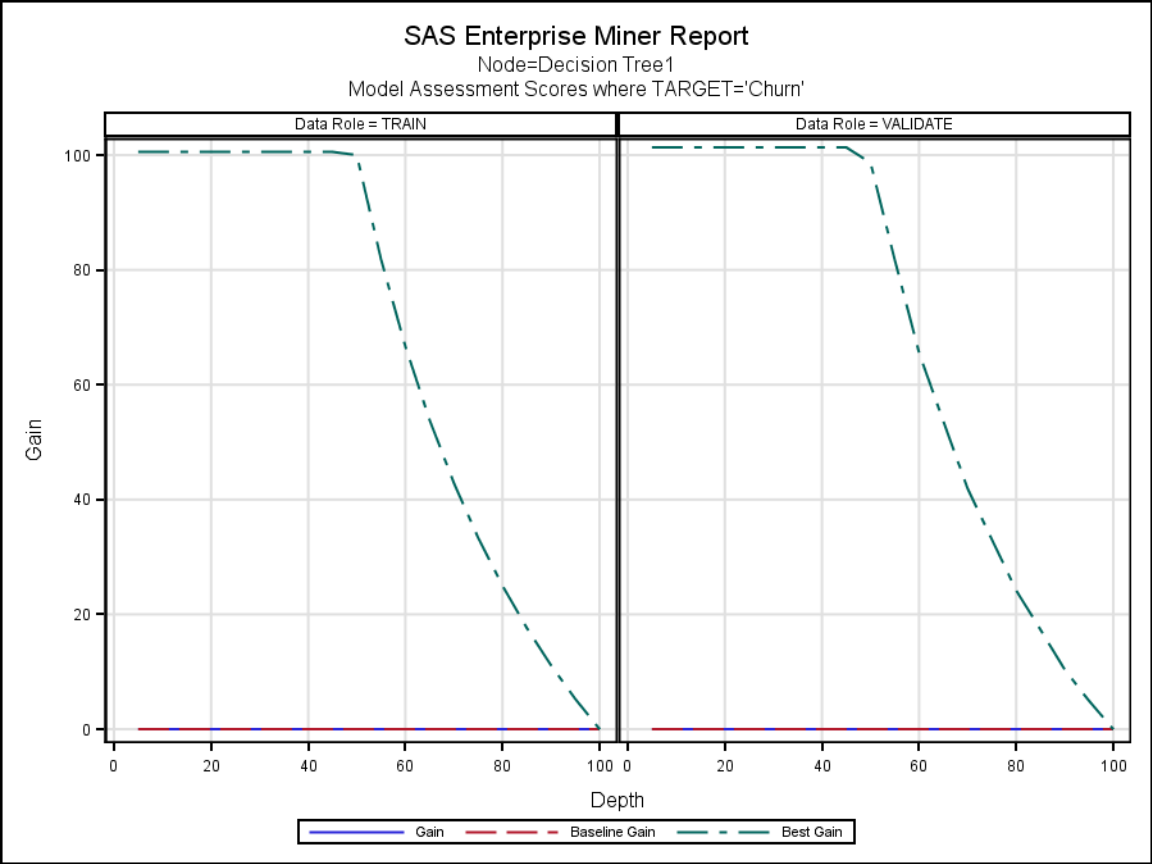
N: 700 149

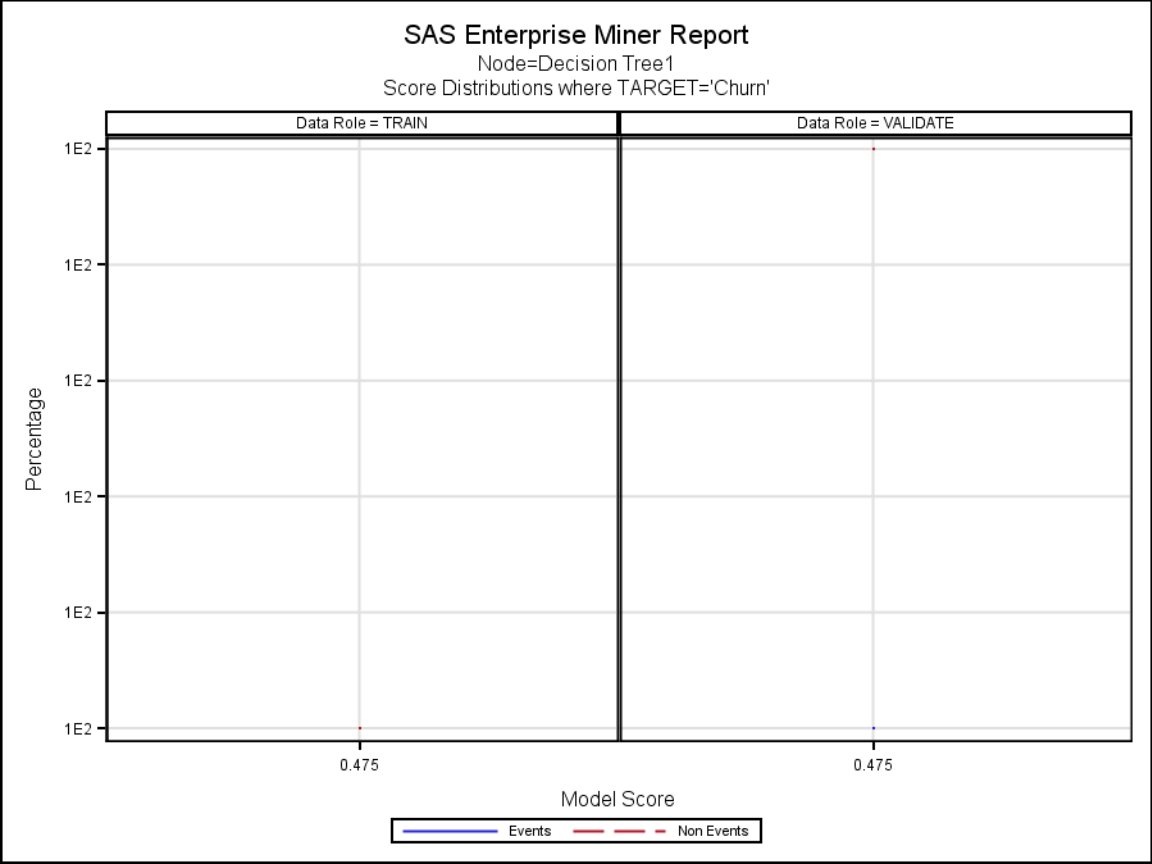
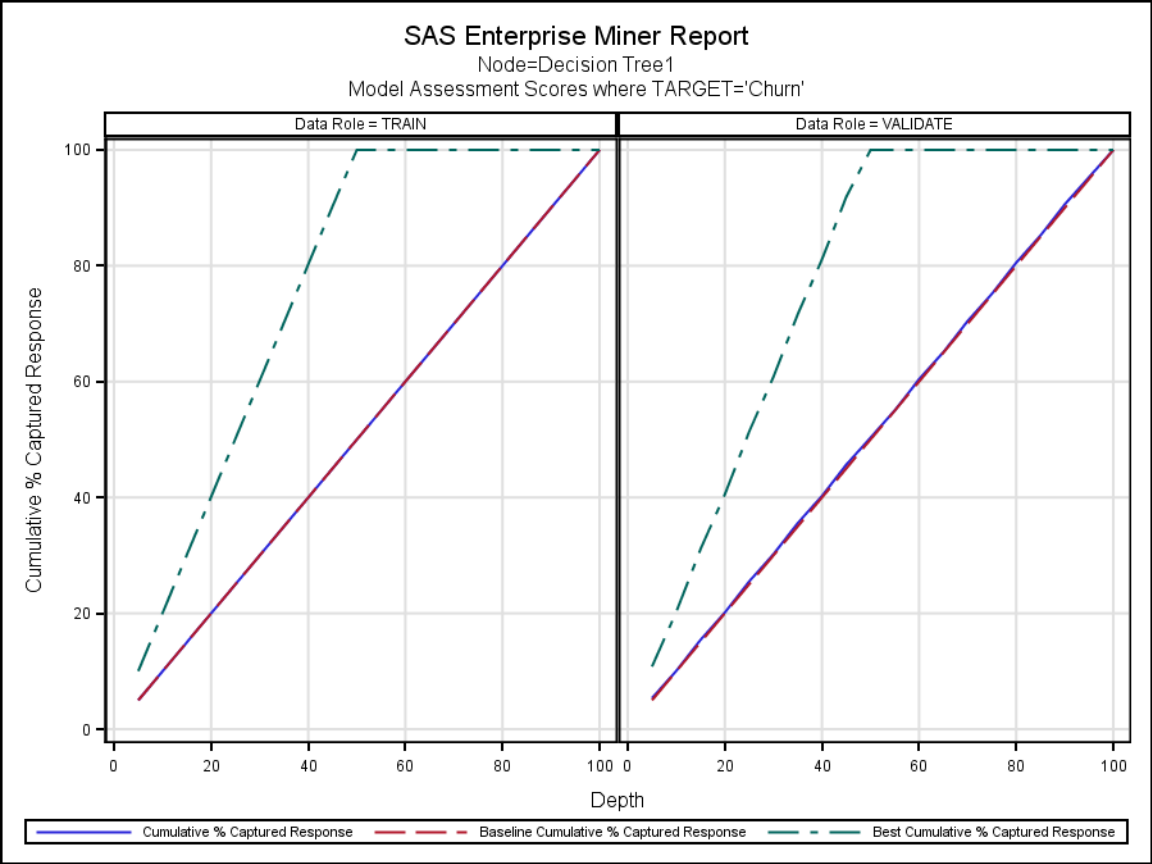
SAS Enterprise Miner Report
Node=Decision Tree1
Treemap

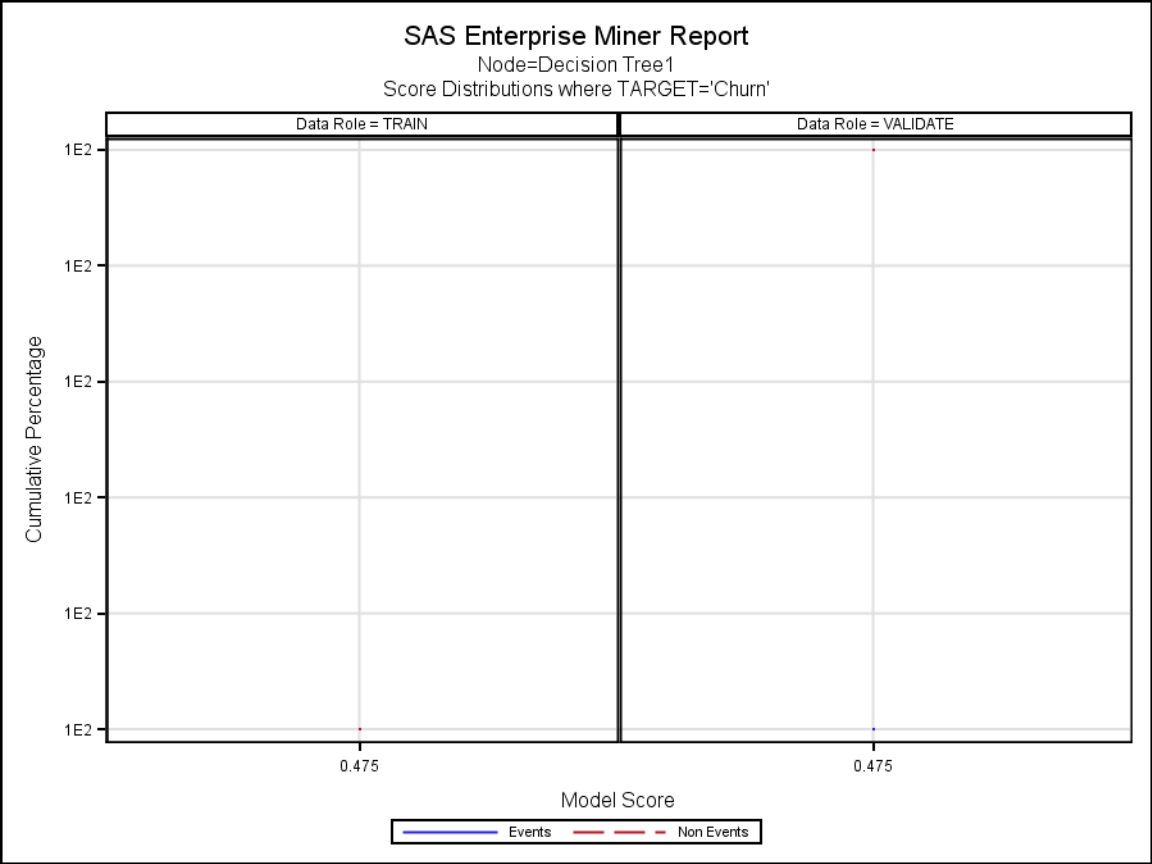


SAS Enterprise Miner Report
Node=Decision Tree1
Model Iteration Plots









Node=Decision Tree1
Score Distributions

Target Variable=Churn Data Role=TRAIN

| Posterior Probability Range | Number of Events | Percentage of Events | Percentage of Nonevents | Cumulative Percentage of Events | Cumulative Percentage of Nonevents |
|-----------------------------|------------------|----------------------|-------------------------|---------------------------------|------------------------------------|
| 0.45-0.50 | 349 | 100 | 100 | 100 | 100 |

Target Variable=Churn Data Role=VALIDATE

| Posterior Probability Range | Number of Events | Percentage of Events | Percentage of Nonevents | Cumulative Percentage of Events | Cumulative Percentage of Nonevents |
|-----------------------------|------------------|----------------------|-------------------------|---------------------------------|------------------------------------|
| 0.45-0.50 | 74 | 100 | 100 | 100 | 100 |

SAS Enterprise Miner Report

Node=HP Forest
Summary

Node id = HPDMForest
Node label = HP Forest
Meta path = Ids2 => Stat3 => Impt2 => Stat4 => Part2 => HPDMForest
Notes =

Node=HP Forest
Properties

| Property | Value | Default | Property | Value | Default | Property | Value | Default |
|----------------|------------|---------|----------------|-------------|---------|---------------|---------------|---------|
| Component | HPDMForest | | MAXTREES | 100 | | SPLITSIZE | . | |
| ALPHA | 0.05 | | MINCATSIZE | 5 | | TRAINFRACTION | 0.6 | |
| CATBINS | 30 | | MINUSEINSEARCH | 1 | | TRAINN | . | |
| EXHAUSTIVE | 5000 | | MISSING | USEINSEARCH | | ToolType | MODEL | |
| LEAFFRACTION | 0.00001 | | NUMOBSMETHOD | PERCENTAGE | | VARSELECT | Y | |
| LEAFSIZE | 1 | | RBACUT | 0.01 | | VAR_ TO_ TRY | . | |
| LEAFSIZEMETHOD | DEFAULT | | RBATOPNUM | 25 | | VIMETHOD | LOSSREDUCTION | |
| MAXDEPTH | 50 | | SEED | 12345 | | | | |

Node=HP Forest
Variable Summary

| Role | Level | Frequency Count | Name |
|--------|----------|--------------------|---|
| TARGET | BINARY | 1 | Churn |
| INPUT | INTERVAL | 4 | Age IMP_TotalPurchases IMP_TotalSpent WebsiteVisits |
| INPUT | NOMINAL | 5 | FavoriteCategory Gender Location MembershipLevel Occupation |
| ID | INTERVAL | 1 | _dataobs_ |
| ID | NOMINAL | 1 | CustomerID |

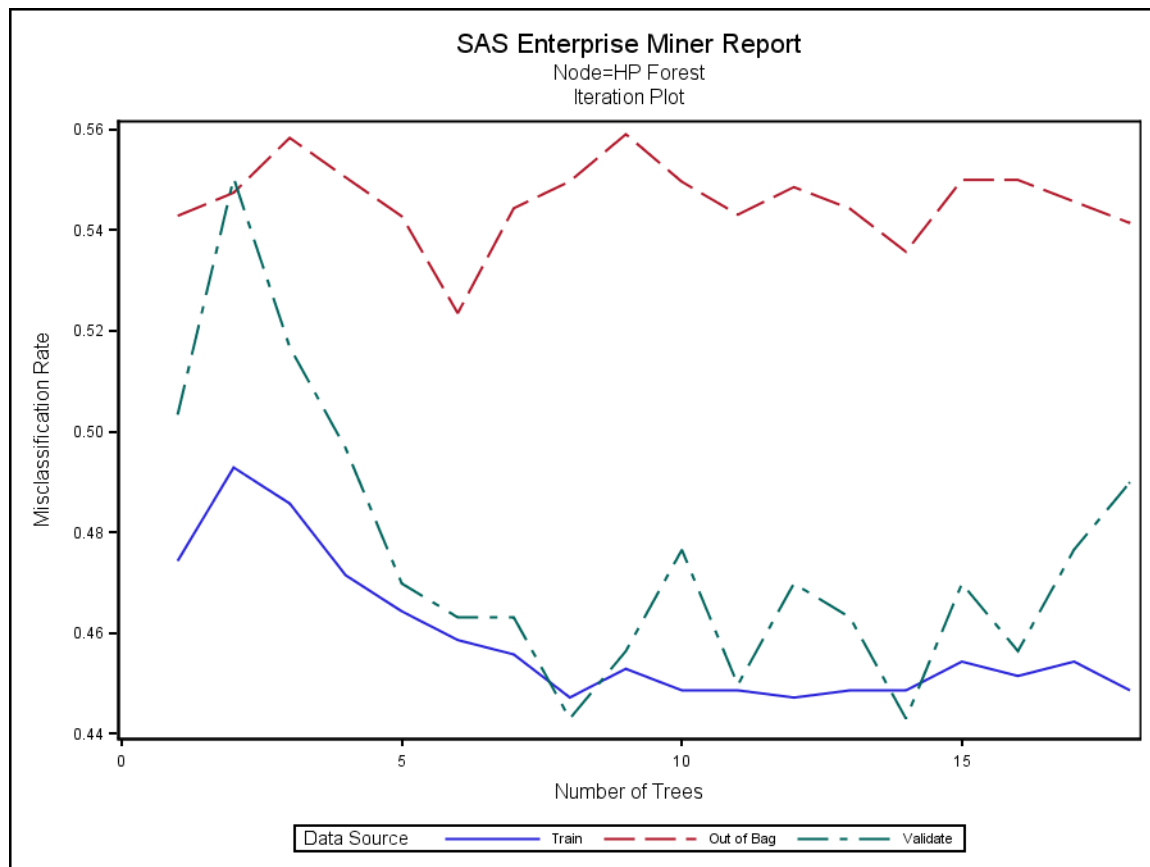
Node=HP Forest
Model Fit Statistics

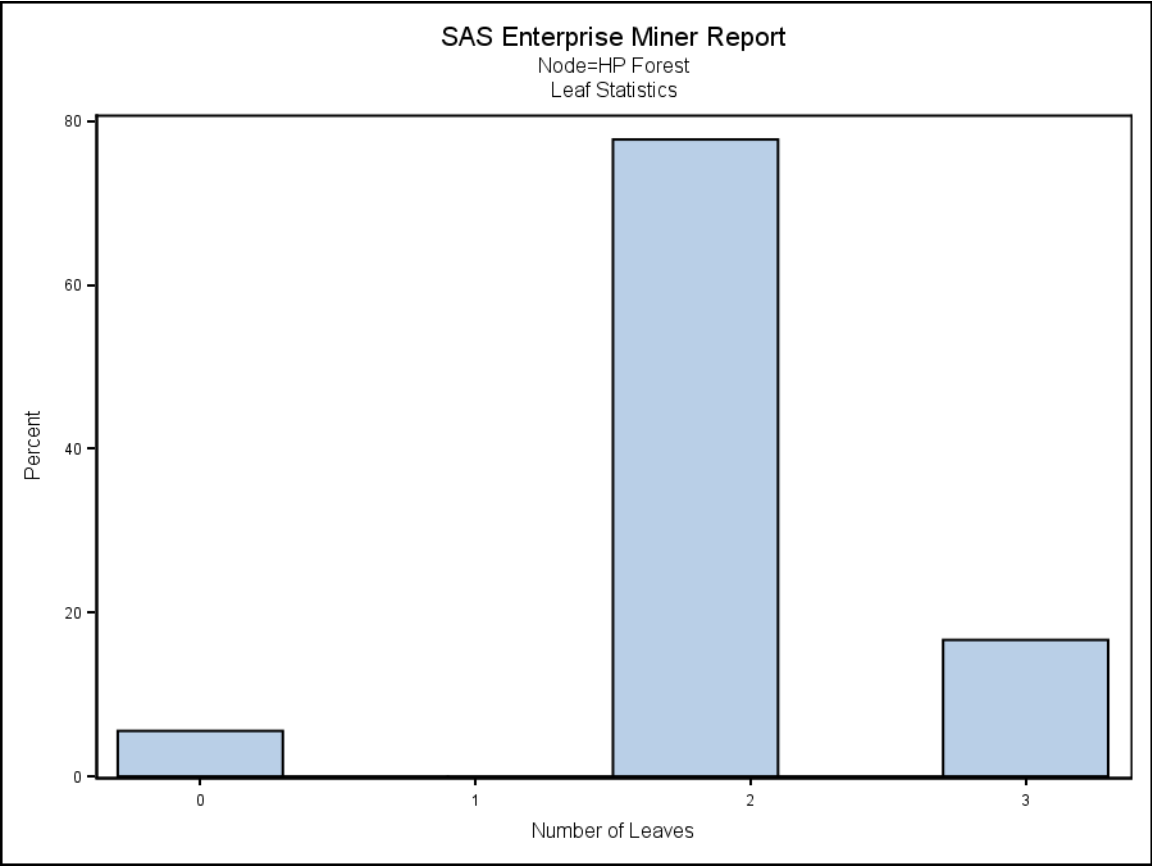
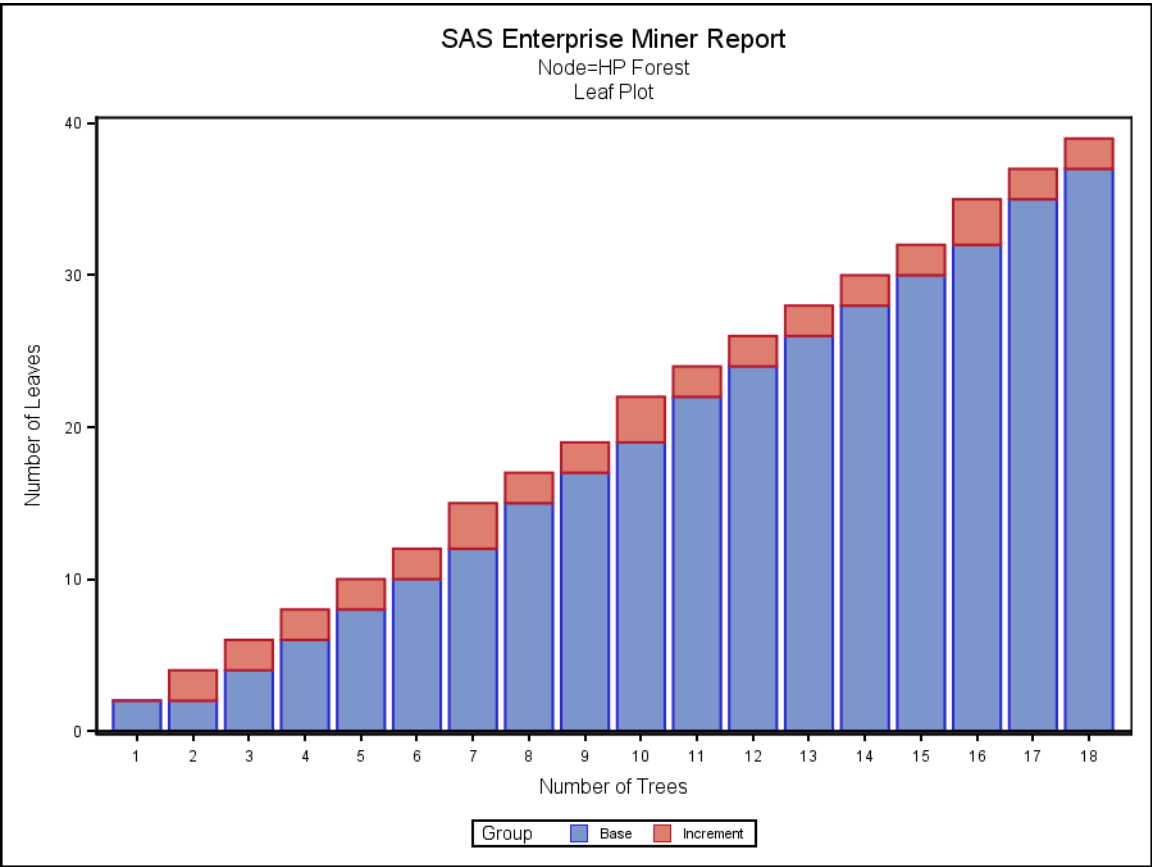
Target=Churn Target Label='1'

| Label of Statistic | Train | Validation | Test |
|---------------------------------|---------|------------|---------|
| Average Squared Error | 0.25 | 0.249 | 0.246 |
| Divisor for ASE | 1400.00 | 298.000 | 302.000 |
| Maximum Absolute Error | 0.63 | 0.619 | 0.624 |
| Sum of Frequencies | 700.00 | 149.000 | 151.000 |
| Root Average Squared Error | 0.50 | 0.499 | 0.496 |
| Sum of Squared Errors | 344.57 | 74.209 | 74.433 |
| Frequency of Classified Cases | 700.00 | 149.000 | 151.000 |
| Misclassification Rate | 0.45 | 0.490 | 0.477 |
| Number of Wrong Classifications | 314.00 | 73.000 | 72.000 |

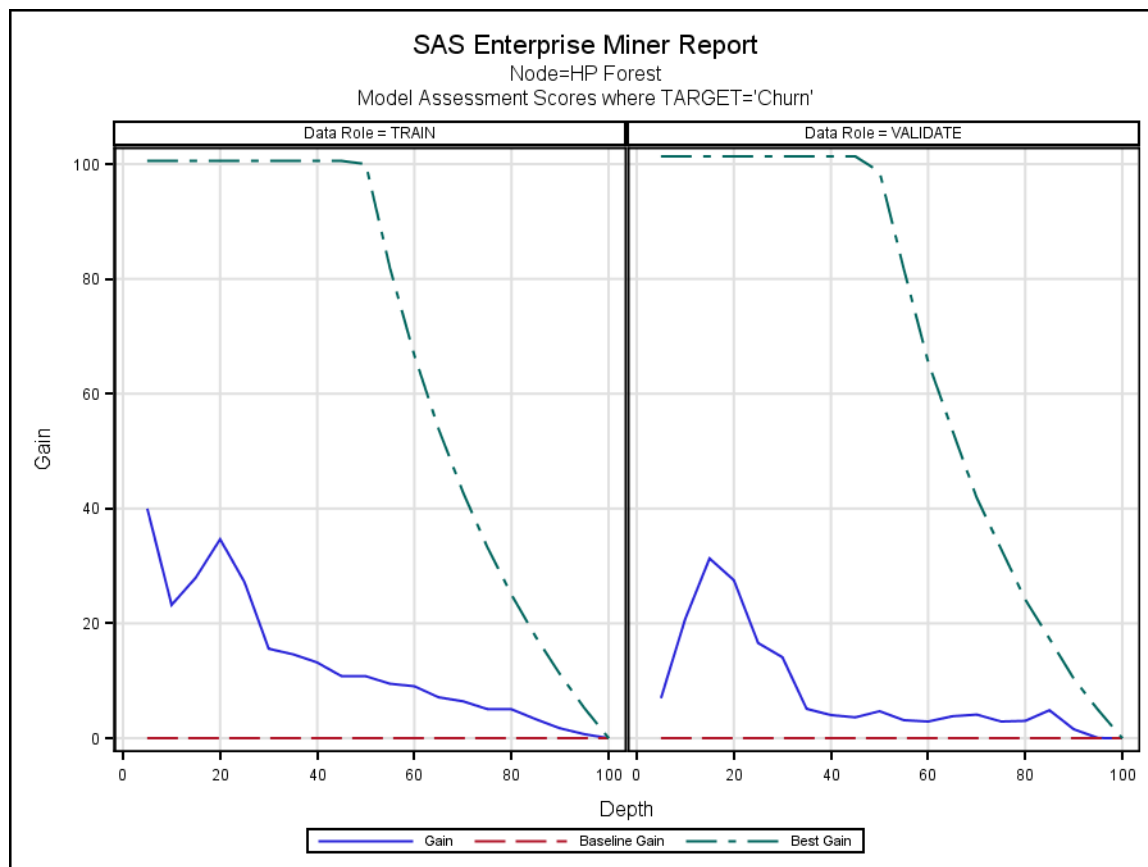
Node=HP Forest
Iteration History

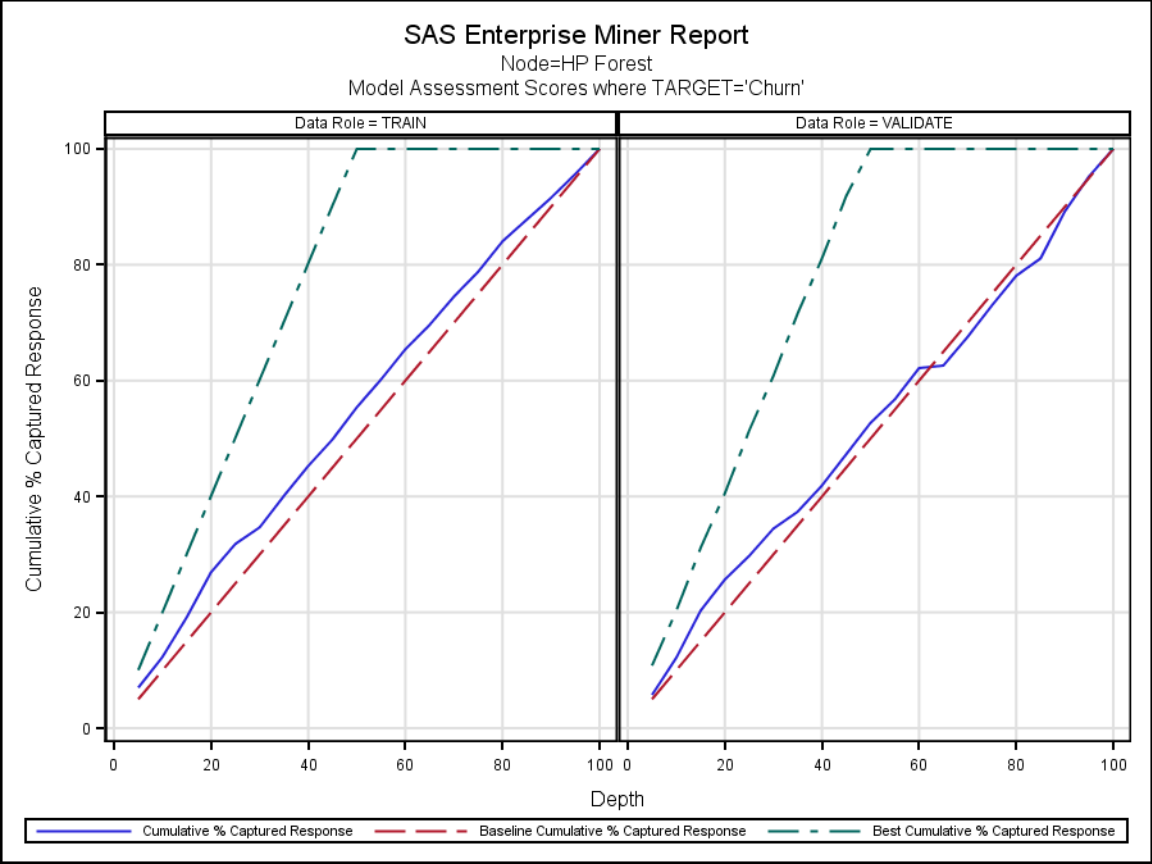
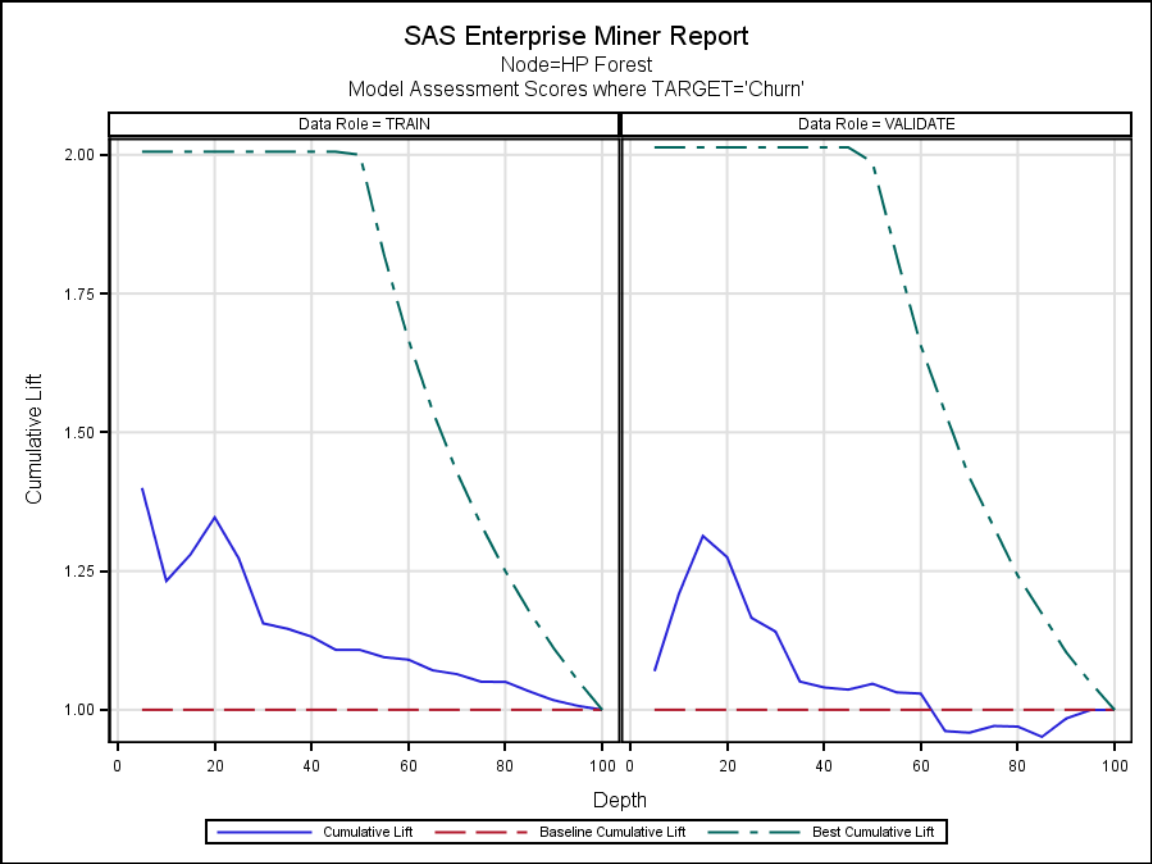
| Number of Trees | Number of Leaves | Average Square Error (Train) | Average Square Error (Out of Bag) | Average Square Error (Validate) | Misclassification Rate (Train) | Misclassification Rate (Out of Bag) | Misclassification Rate (Validate) | Log Loss (Train) | Log Loss (Out of Bag) | Log Loss (Validate) |
|-----------------|------------------|------------------------------|-----------------------------------|---------------------------------|--------------------------------|-------------------------------------|-----------------------------------|------------------|-----------------------|---------------------|
| 1 | 2 | 0.253 | 0.269 | 0.260 | 0.474 | 0.543 | 0.503 | 0.700 | 0.732 | 0.713 |
| 2 | 4 | 0.250 | 0.262 | 0.255 | 0.493 | 0.547 | 0.550 | 0.694 | 0.719 | 0.704 |
| 3 | 6 | 0.249 | 0.261 | 0.252 | 0.486 | 0.558 | 0.517 | 0.691 | 0.715 | 0.697 |
| 4 | 8 | 0.248 | 0.258 | 0.250 | 0.471 | 0.550 | 0.497 | 0.688 | 0.709 | 0.693 |
| 5 | 10 | 0.247 | 0.257 | 0.249 | 0.464 | 0.543 | 0.470 | 0.688 | 0.708 | 0.692 |
| 6 | 12 | 0.247 | 0.256 | 0.249 | 0.459 | 0.524 | 0.463 | 0.687 | 0.706 | 0.691 |
| 7 | 15 | 0.247 | 0.257 | 0.249 | 0.456 | 0.544 | 0.463 | 0.686 | 0.708 | 0.691 |
| 8 | 17 | 0.247 | 0.256 | 0.249 | 0.447 | 0.550 | 0.443 | 0.687 | 0.706 | 0.691 |
| 9 | 19 | 0.247 | 0.256 | 0.249 | 0.453 | 0.559 | 0.456 | 0.687 | 0.706 | 0.690 |
| 10 | 22 | 0.247 | 0.256 | 0.249 | 0.449 | 0.550 | 0.477 | 0.686 | 0.706 | 0.691 |
| 11 | 24 | 0.247 | 0.256 | 0.248 | 0.449 | 0.543 | 0.450 | 0.686 | 0.705 | 0.689 |
| 12 | 26 | 0.246 | 0.256 | 0.249 | 0.447 | 0.549 | 0.470 | 0.686 | 0.705 | 0.690 |
| 13 | 28 | 0.246 | 0.256 | 0.248 | 0.449 | 0.544 | 0.463 | 0.685 | 0.704 | 0.690 |
| 14 | 30 | 0.246 | 0.255 | 0.248 | 0.449 | 0.536 | 0.443 | 0.686 | 0.704 | 0.690 |
| 15 | 32 | 0.246 | 0.256 | 0.249 | 0.454 | 0.550 | 0.470 | 0.685 | 0.705 | 0.691 |
| 16 | 35 | 0.246 | 0.256 | 0.249 | 0.451 | 0.550 | 0.456 | 0.685 | 0.705 | 0.691 |
| 17 | 37 | 0.246 | 0.255 | 0.249 | 0.454 | 0.546 | 0.477 | 0.686 | 0.704 | 0.690 |
| 18 | 39 | 0.246 | 0.255 | 0.249 | 0.449 | 0.541 | 0.490 | 0.685 | 0.704 | 0.691 |

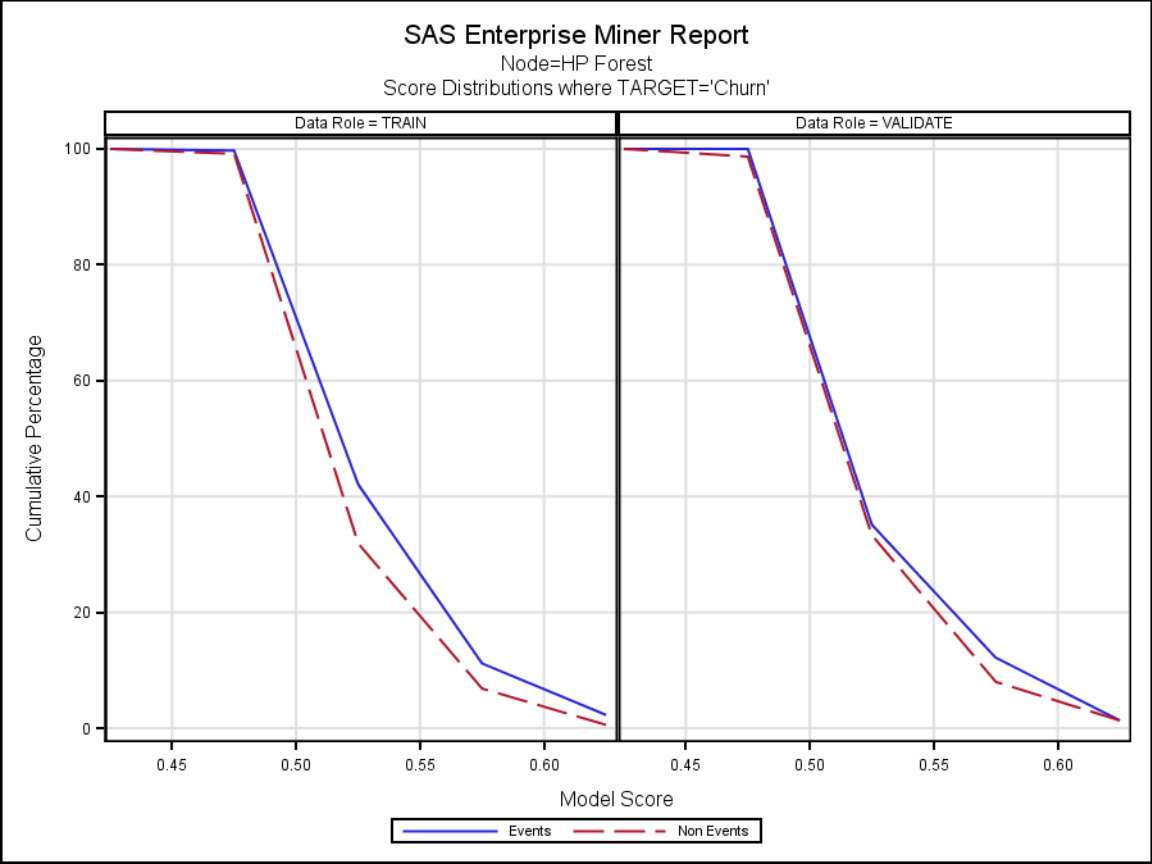
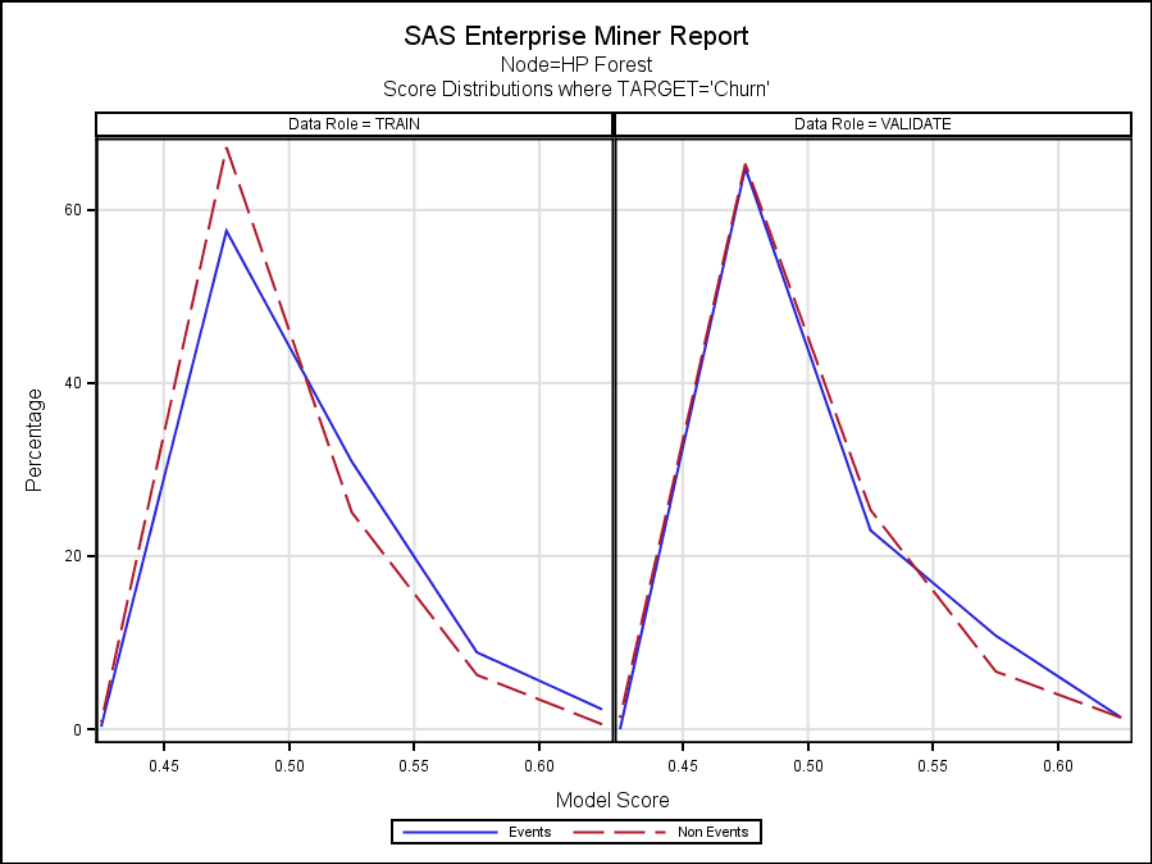




| Variable Name | Number of Splitting Rules | Train: Gini Reduction | Train: Margin Reduction | OOB: Gini Reduction | OOB: Margin Reduction | Valid: Gini Reduction | Valid: Margin Reduction | Label |
|--------------------|---------------------------|-----------------------|-------------------------|---------------------|-----------------------|-----------------------|-------------------------|------------------------|
| IMP_TotalSpent | 9 | 0.004877 | 0.009754 | -0.00900 | -0.00355 | -0.00007 | 0.00445 | Imputed TotalSpent |
| Age | 3 | 0.001288 | 0.002576 | -0.00301 | -0.00173 | -0.00101 | 0.00023 | |
| FavoriteCategory | 3 | 0.001490 | 0.002979 | -0.00146 | -0.00001 | -0.00240 | -0.00093 | |
| Occupation | 3 | 0.001332 | 0.002663 | -0.00221 | -0.00096 | -0.00059 | 0.00064 | |
| WebsiteVisits | 2 | 0.001207 | 0.002414 | -0.00265 | -0.00128 | -0.00152 | -0.00019 | |
| Location | 1 | 0.000743 | 0.001487 | -0.00125 | -0.00059 | -0.00103 | -0.00032 | |
| Gender | 0 | 0.000000 | 0.000000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | |
| IMP_TotalPurchases | 0 | 0.000000 | 0.000000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | Imputed TotalPurchases |
| MembershipLevel | 0 | 0.000000 | 0.000000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | |







Target Variable=Churn Data Role=TRAIN

| Posterior Probability Range | Number of Events | Percentage of Events | Percentage of Nonevents | Cumulative Percentage of Events | Cumulative Percentage of Nonevents |
|-----------------------------|------------------|----------------------|-------------------------|---------------------------------|------------------------------------|
| 0.60-0.65 | 8 | 2.2923 | 0.5698 | 2.292 | 0.570 |
| 0.55-0.60 | 31 | 8.8825 | 6.2678 | 11.175 | 6.838 |
| 0.50-0.55 | 108 | 30.9456 | 25.0712 | 42.120 | 31.909 |
| 0.45-0.50 | 201 | 57.5931 | 67.2365 | 99.713 | 99.145 |
| 0.40-0.45 | 1 | 0.2865 | 0.8547 | 100.000 | 100.000 |

Target Variable=Churn Data Role=VALIDATE

| Posterior Probability Range | Number of Events | Percentage of Events | Percentage of Nonevents | Cumulative Percentage of Events | Cumulative Percentage of Nonevents |
|-----------------------------|------------------|----------------------|-------------------------|---------------------------------|------------------------------------|
| 0.60-0.65 | 1 | 1.3514 | 1.3333 | 1.351 | 1.333 |
| 0.55-0.60 | 8 | 10.8108 | 6.6667 | 12.162 | 8.000 |
| 0.50-0.55 | 17 | 22.9730 | 25.3333 | 35.135 | 33.333 |
| 0.45-0.50 | 48 | 64.8649 | 65.3333 | 100.000 | 98.667 |
| 0.40-0.45 | 0 | 0.0000 | 1.3333 | 100.000 | 100.000 |

SAS Enterprise Miner Report

Node=Gradient Boosting
Summary

Node id = Boost
Node label = Gradient Boosting
Meta path = Ids2 => Stat3 => Impt2 => Stat4 => Part2 => 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 | |

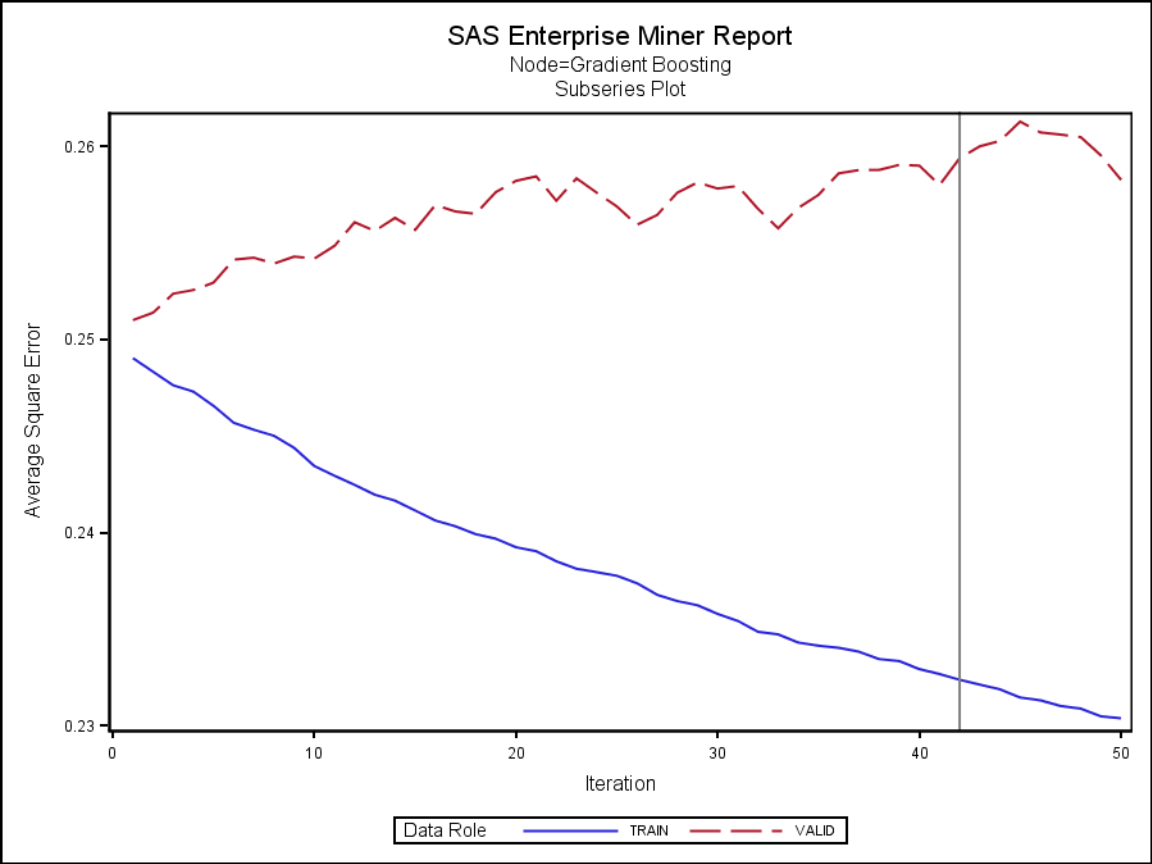
Node=Gradient Boosting
Variable Summary

| Role | Level | Frequency Count | Name |
|--------|----------|--------------------|---|
| TARGET | BINARY | 1 | Churn |
| INPUT | INTERVAL | 4 | Age IMP_TotalPurchases IMP_TotalSpent WebsiteVisits |
| INPUT | NOMINAL | 5 | FavoriteCategory Gender Location MembershipLevel Occupation |
| ID | INTERVAL | 1 | _dataobs_ |
| ID | NOMINAL | 1 | CustomerID |

Node=Gradient Boosting
Model Fit Statistics

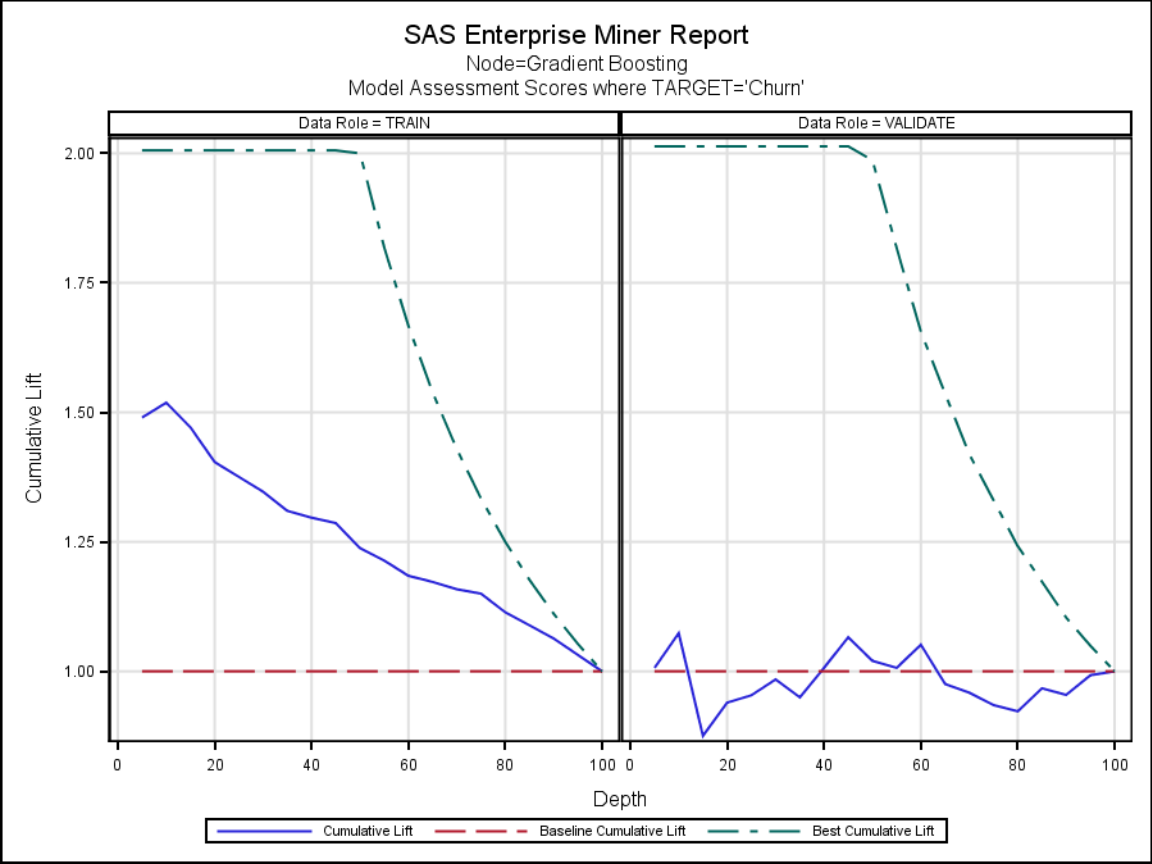
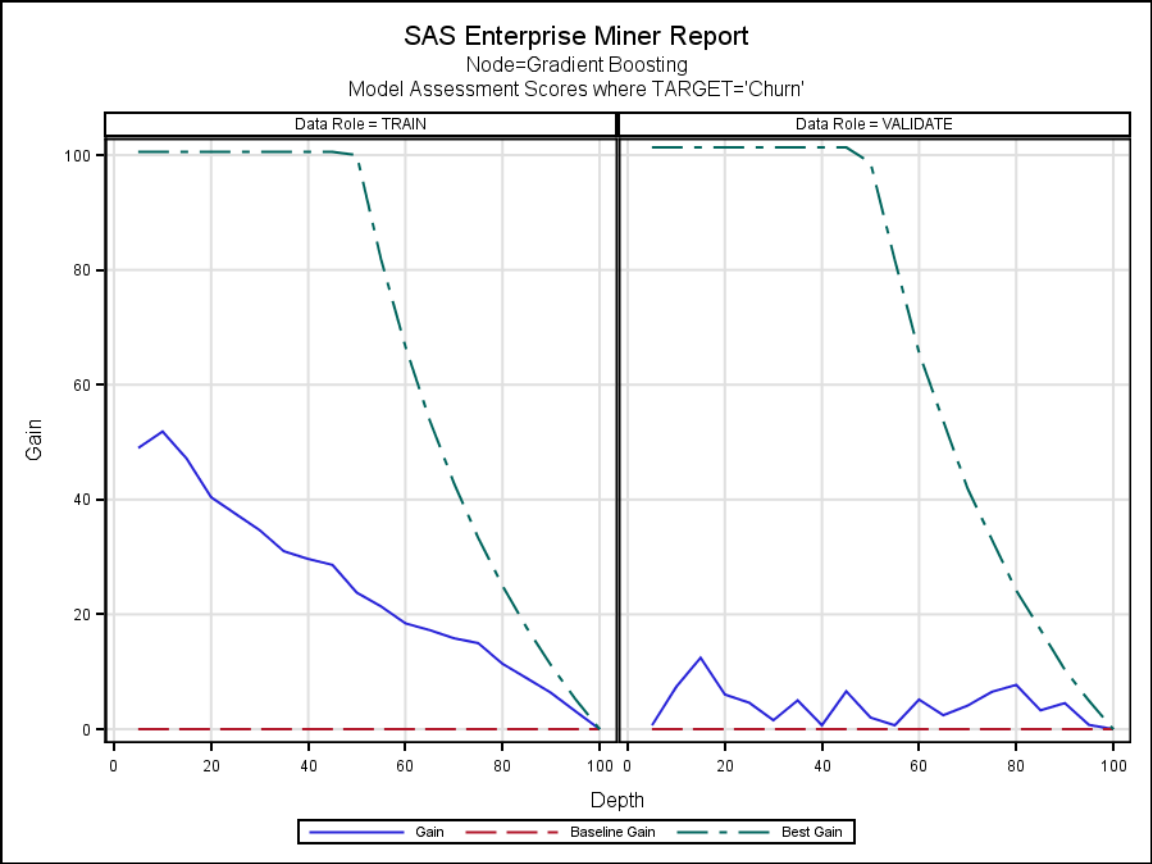
Target=Churn Target Label=''

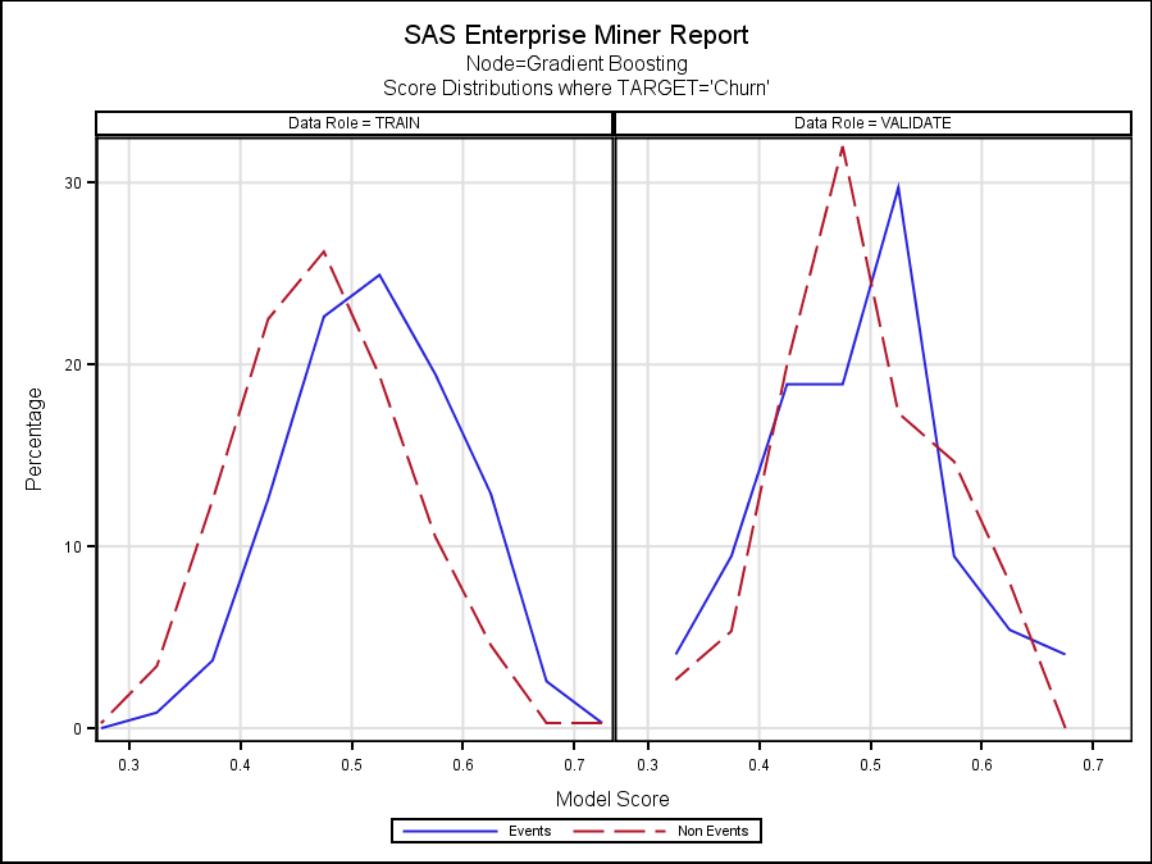
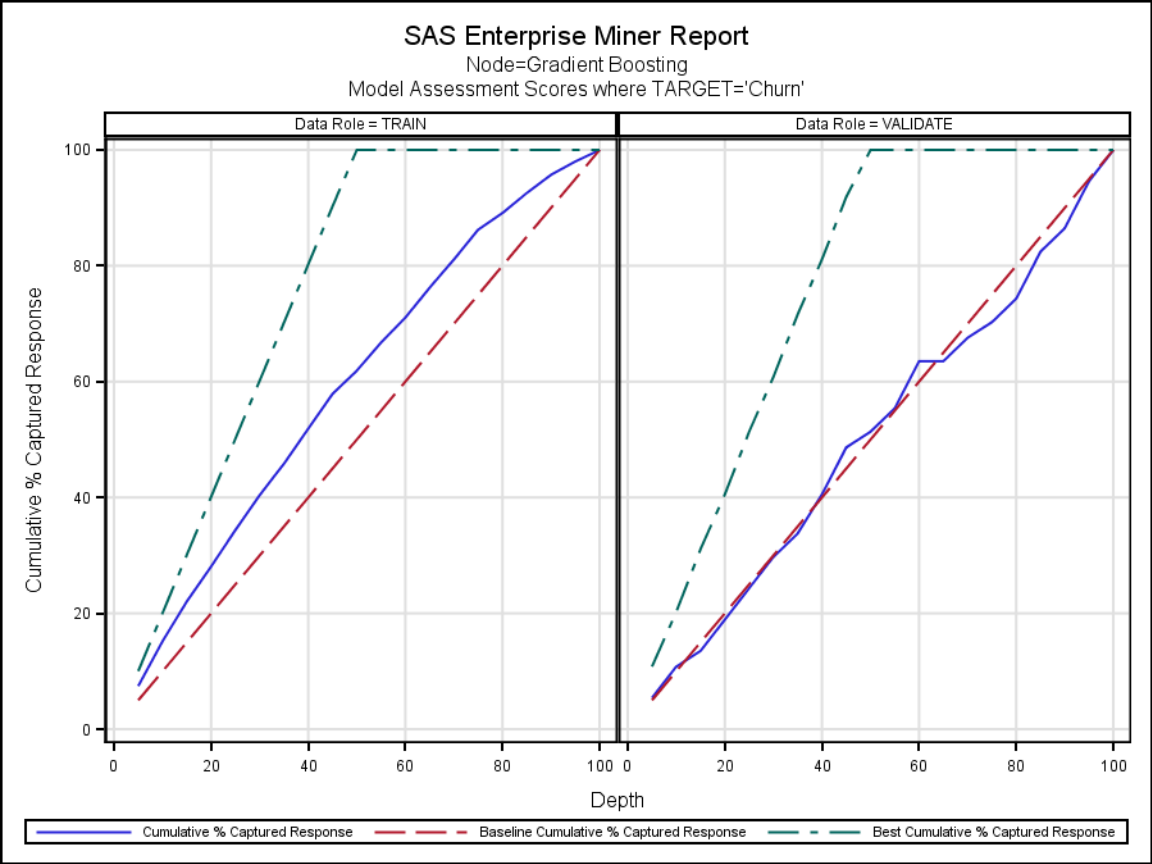
| Label of Statistic | Train | Validation | Test |
|--------------------------------|---------|------------|---------|
| Sum of Frequencies | 700.00 | 149.000 | 151.000 |
| Sum of Case Weights Times Freq | 1400.00 | 298.000 | 302.000 |
| Misclassification Rate | 0.37 | 0.456 | 0.497 |
| Maximum Absolute Error | 0.70 | 0.672 | 0.691 |
| Sum of Squared Errors | 325.73 | 76.886 | 77.660 |
| Average Squared Error | 0.23 | 0.258 | 0.257 |
| Root Average Squared Error | 0.48 | 0.508 | 0.507 |
| Divisor for ASE | 1400.00 | 298.000 | 302.000 |
| Total Degrees of Freedom | 700.00 | . | . |

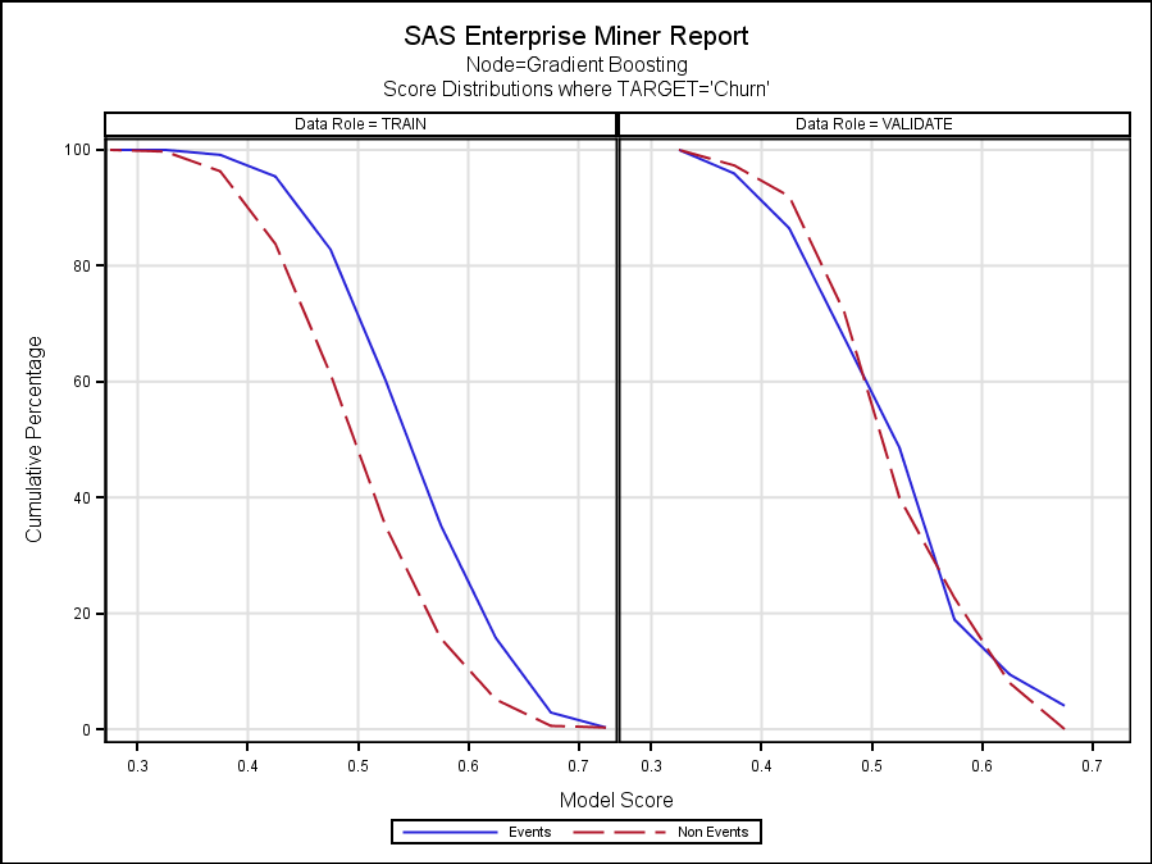


Node=Gradient Boosting
Variable Importance

| Variable Name | Label | Number of Splitting Rules | Importance | Validation Importance | Ratio of Validation to Training Importance |
|--------------------|------------------------|---------------------------|------------|-----------------------|--|
| Location | | 21 | 1.00000 | 0.63721 | 0.63721 |
| Age | | 20 | 0.95673 | 1.00000 | 1.04522 |
| WebsiteVisits | | 17 | 0.86582 | 0.82365 | 0.95128 |
| FavoriteCategory | | 16 | 0.83270 | 0.38357 | 0.46064 |
| IMP_TotalSpent | Imputed TotalSpent | 13 | 0.81965 | 0.80678 | 0.98430 |
| Occupation | | 6 | 0.53163 | 0.00000 | 0.00000 |
| MembershipLevel | | 5 | 0.49024 | 0.00000 | 0.00000 |
| IMP_TotalPurchases | Imputed TotalPurchases | 3 | 0.33223 | 0.29292 | 0.88167 |
| Gender | | 1 | 0.23735 | 0.00000 | 0.00000 |







Node=Gradient Boosting
Score Distributions

Target Variable=Churn Data Role=TRAIN

| Posterior Probability Range | Number of Events | Percentage of Events | Percentage of Nonevents | Cumulative Percentage of Events | Cumulative Percentage of Nonevents |
|-----------------------------|------------------|----------------------|-------------------------|---------------------------------|------------------------------------|
| 0.70-0.75 | 1 | 0.2865 | 0.2849 | 0.287 | 0.285 |
| 0.65-0.70 | 9 | 2.5788 | 0.2849 | 2.865 | 0.570 |
| 0.60-0.65 | 45 | 12.8940 | 4.5584 | 15.759 | 5.128 |
| 0.55-0.60 | 68 | 19.4842 | 10.5413 | 35.244 | 15.670 |
| 0.50-0.55 | 87 | 24.9284 | 19.3732 | 60.172 | 35.043 |
| 0.45-0.50 | 79 | 22.6361 | 26.2108 | 82.808 | 61.254 |
| 0.40-0.45 | 44 | 12.6074 | 22.5071 | 95.415 | 83.761 |
| 0.35-0.40 | 13 | 3.7249 | 12.5356 | 99.140 | 96.296 |
| 0.30-0.35 | 3 | 0.8596 | 3.4188 | 100.000 | 99.715 |
| 0.25-0.30 | 0 | 0.0000 | 0.2849 | 100.000 | 100.000 |

Target Variable=Churn Data Role=VALIDATE

| Posterior Probability Range | Number of Events | Percentage of Events | Percentage of Nonevents | Cumulative Percentage of Events | Cumulative Percentage of Nonevents |
|-----------------------------|------------------|----------------------|-------------------------|---------------------------------|------------------------------------|
| 0.65-0.70 | 3 | 4.0541 | 0.0000 | 4.054 | 0.000 |
| 0.60-0.65 | 4 | 5.4054 | 8.0000 | 9.459 | 8.000 |
| 0.55-0.60 | 7 | 9.4595 | 14.6667 | 18.919 | 22.667 |
| 0.50-0.55 | 22 | 29.7297 | 17.3333 | 48.649 | 40.000 |
| 0.45-0.50 | 14 | 18.9189 | 32.0000 | 67.568 | 72.000 |

Target Variable=Churn Data Role=VALIDATE

| Posterior Probability Range | Number of Events | Percentage of Events | Percentage of Nonevents | Cumulative Percentage of Events | Cumulative Percentage of Nonevents |
|-----------------------------|------------------|----------------------|-------------------------|---------------------------------|------------------------------------|
| 0.40-0.45 | 14 | 18.9189 | 20.0000 | 86.486 | 92.000 |
| 0.35-0.40 | 7 | 9.4595 | 5.3333 | 95.946 | 97.333 |
| 0.30-0.35 | 3 | 4.0541 | 2.6667 | 100.000 | 100.000 |

SAS Enterprise Miner Report

Node=EM_SAVE_TRAIN
Summary

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

Node=EM_SAVE_TRAIN
Properties

| Property | Value | Default | Property | Value | Default | Property | Value | Default |
|------------------------------|---------------------|---------|----------------------|--------------|---------|-------------------|---------------|---------|
| Component | DataSource | | DsCreatedBy | HP | | NBytes | 132096 | . |
| ApplyIntervalLevelLowerLimit | Y | | DsId | emsavetrain | | NCols | 11 | . |
| ApplyMaxClassLevels | Y | | DsModifiedBy | HP | | NObs | 1000 | . |
| ApplyMaxPercentMissing | Y | | DsModifyDate | 2020262872.9 | | NewTable | | |
| CMeta | WORK.M3FNAYS_ | | DsSampleName | | | NewVariableRole | REJECT | |
| ComputeStatistics | N | | DsSampleSize | | | OutputType | VIEW | |
| DBPassThrough | Y | | DsSampleSizeType | | | Role | RAW | TRAIN |
| Data | AAEM2.EM_SAVE_TRAIN | | DsScope | LOCAL | | Sample | D | |
| DataSelection | DATASOURCE | | IdentifyEmptyColumns | Y | | SampleSizeObs | 10000 | |
| DataSource | emsavetrain | | IntervalLowerLimit | 20 | | SampleSizePercent | 20 | |
| DataSourceRole | RAW | | Library | AAEM2 | | SampleSizeType | PERCENT | |
| Description | | | MaxClassLevels | 20 | | Scope | LOCAL | |
| DropMapVariables | Y | | MaxPercentMissing | 50 | | Segment | | |
| DsCreateDate | 2020262872.8 | | MetaAdvisor | BASIC | | Table | EM_SAVE_TRAIN | |

Node=EM_SAVE_TRAIN
Data Attributes

| Attribute | Value | Attribute | Value | Attribute | Value |
|------------|---------------|----------------|---------------------|--------------|--------|
| Data Name | EM_SAVE_TRAIN | Date Created | 07/01/2024 19:20:45 | Data Size | 132096 |
| Data Type | DATA | Date Modified | 07/01/2024 19:20:45 | Role | RAW |
| Data Label | | Number Rows | 1000 | Segment | |
| Engine | BASE | Number Columns | 11 | Data Library | AAEM2 |

Node=EM_SAVE_TRAIN
Variables List

| Name | Label | Role | Level | Type | Length | Format | Creator |
|------------------|-------|--------|----------|------|--------|----------|---------|
| Age | | INPUT | INTERVAL | N | 8 | BEST12.0 | |
| Churn | | TARGET | BINARY | N | 8 | BEST12.0 | |
| CustomerID | | ID | NOMINAL | N | 8 | BEST12.0 | |
| FavoriteCategory | | INPUT | NOMINAL | C | 11 | \$11. | |
| Gender | | INPUT | NOMINAL | C | 6 | \$6. | |
| Location | | INPUT | NOMINAL | C | 9 | \$9. | |
| MembershipLevel | | INPUT | NOMINAL | C | 8 | \$8. | |
| Occupation | | INPUT | NOMINAL | C | 13 | \$13. | |
| TotalPurchases | | INPUT | INTERVAL | N | 8 | BEST12.0 | |
| TotalSpent | | INPUT | INTERVAL | N | 8 | BEST12.0 | |
| WebsiteVisits | | 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

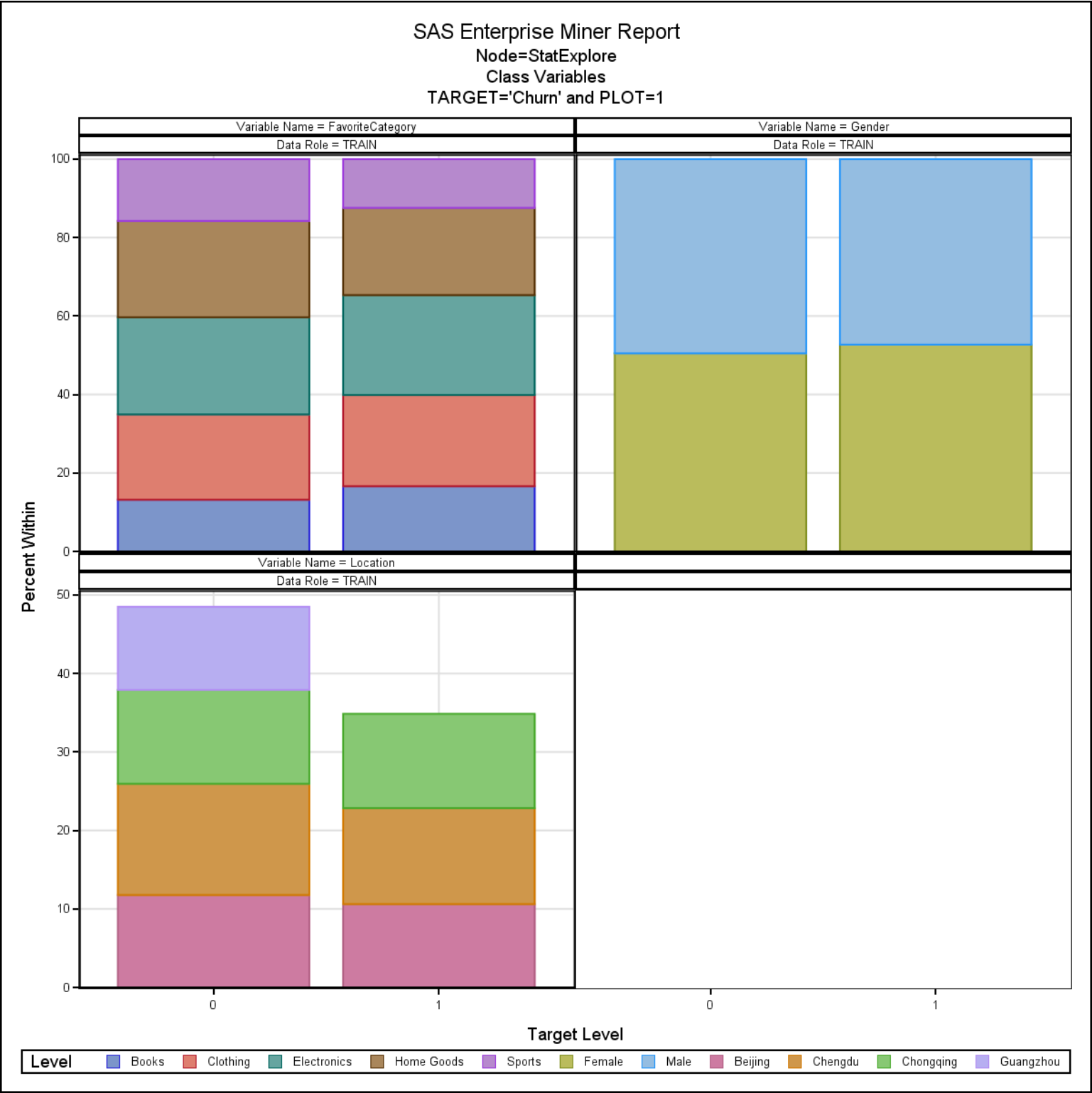
| Property | Value | Default | Property | Value | Default | Property | Value | Default |
|------------------------|-------------|---------|----------------------|-------|---------|-------------|--------|---------|
| Component | StatExplore | | Correlation | Y | | NObs | 100000 | 1000000 |
| BySegment | N | Y | DropRejected | Y | | Pearson | Y | |
| ChiSquare | Y | | HideVariable | Y | | Spearman | N | |
| ChiSquareInterval | 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 TotalPurchases TotalSpent WebsiteVisits |
| INPUT | NOMINAL | 5 | FavoriteCategory Gender Location MembershipLevel Occupation |

| Target | Variable | Importance | Worth | Analysis Variable | Label | plot |
|--------|------------------|------------|----------|-------------------|------------------|------|
| Churn | TotalSpent | 1 | 0.012734 | 1 | TotalSpent | . |
| Churn | TotalPurchases | 2 | 0.007780 | 1 | TotalPurchases | . |
| Churn | Age | 3 | 0.007133 | 1 | Age | . |
| Churn | WebsiteVisits | 4 | 0.006525 | 1 | WebsiteVisits | . |
| Churn | Location | 5 | 0.002921 | 1 | Location | . |
| Churn | FavoriteCategory | 6 | 0.002427 | 1 | FavoriteCategory | . |
| Churn | Occupation | 7 | 0.000263 | 1 | Occupation | . |
| Churn | MembershipLevel | 8 | 0.000262 | 1 | MembershipLevel | . |
| Churn | Gender | 9 | 0.000244 | 1 | Gender | . |

| Data Role | Segment | Segment Id | Segment Name:Value | Target | Input | Cramer's V | Prob | Chi-Square | Df | Role | Label | Ordered Inputs | Group | Plot |
|-----------|---------|------------|--------------------|--------|------------------|------------|--------|------------|----|-------|------------------|----------------|-------|------|
| TRAIN | | | _OVERALL_ | Churn | Location | 0.077212 | 0.5442 | 5.9618 | 7 | INPUT | Location | 1 | 1 | 1 |
| TRAIN | | | _OVERALL_ | Churn | FavoriteCategory | 0.069673 | 0.3026 | 4.8543 | 4 | INPUT | FavoriteCategory | 2 | 2 | 1 |
| TRAIN | | | _OVERALL_ | Churn | Occupation | 0.022952 | 0.9130 | 0.5268 | 3 | INPUT | Occupation | 3 | 3 | 1 |
| TRAIN | | | _OVERALL_ | Churn | MembershipLevel | 0.022880 | 0.9137 | 0.5235 | 3 | INPUT | MembershipLevel | 4 | 4 | 1 |
| TRAIN | | | _OVERALL_ | Churn | Gender | 0.022075 | 0.4851 | 0.4873 | 1 | INPUT | Gender | 5 | 5 | 1 |



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 | 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 | MEDIAN | MEAN | Splitsize | . | |
| ImputeNoMissing | N | | MethodTargetClass | NONE | | ValidateTestMissing | N | |
| Indicator | NONE | | MethodTargetInterval | NONE | | | | |

Node=Impute Variable Summary

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

Node=Impute Imputation Summary

| Variable Name | Impute Method | Imputed Variable | Impute Value | Role | Measurement Level | Label | Number of Missing for TRAIN |
|----------------|------------------|--------------------|--------------|-------|----------------------|-------|-----------------------------------|
| TotalPurchases | MEDIAN | IMP_TotalPurchases | 40 | INPUT | INTERVAL | | 17 |
| TotalSpent | MEDIAN | IMP_TotalSpent | 4039 | INPUT | INTERVAL | | 39 |

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

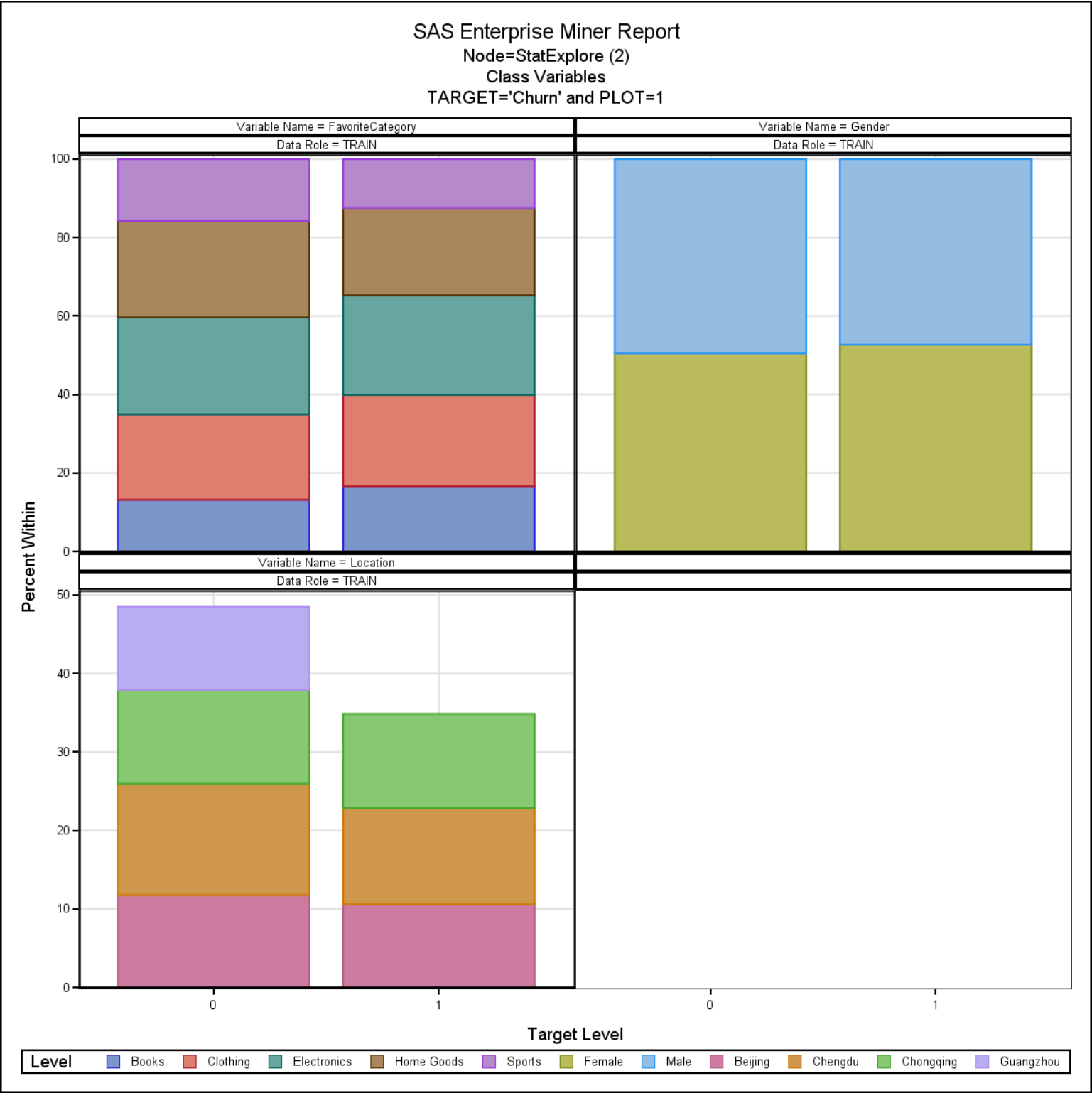
| Property | Value | Default | Property | Value | Default | Property | Value | Default |
|------------------------|-------------|---------|----------------------|-------|---------|-------------|--------|---------|
| Component | StatExplore | | Correlation | Y | | NObs | 100000 | 1000000 |
| BySegment | 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 | INTERVAL | 4 | Age IMP_TotalPurchases IMP_TotalSpent WebsiteVisits |
| INPUT | NOMINAL | 5 | FavoriteCategory Gender Location MembershipLevel Occupation |

| Target | Variable | Importance | Worth | Analysis Variable | Label | plot |
|--------|--------------------|------------|----------|-------------------|------------------------|------|
| Churn | IMP_TotalSpent | 1 | 0.012734 | 1 | Imputed TotalSpent | . |
| Churn | IMP_TotalPurchases | 2 | 0.008815 | 1 | Imputed TotalPurchases | . |
| Churn | Age | 3 | 0.007133 | 1 | Age | . |
| Churn | WebsiteVisits | 4 | 0.006525 | 1 | WebsiteVisits | . |
| Churn | Location | 5 | 0.002921 | 1 | Location | . |
| Churn | FavoriteCategory | 6 | 0.002427 | 1 | FavoriteCategory | . |
| Churn | Occupation | 7 | 0.000263 | 1 | Occupation | . |
| Churn | MembershipLevel | 8 | 0.000262 | 1 | MembershipLevel | . |
| Churn | Gender | 9 | 0.000244 | 1 | Gender | . |

| Data Role | Segment | Segment Id | Segment Name:Value | Target | Input | Cramer's V | Prob | Chi-Square | Df | Role | Label | Ordered Inputs | Group | Plot |
|-----------|---------|------------|--------------------|--------|------------------|------------|--------|------------|----|-------|------------------|----------------|-------|------|
| TRAIN | | | _OVERALL_ | Churn | Location | 0.077212 | 0.5442 | 5.9618 | 7 | INPUT | Location | 1 | 1 | 1 |
| TRAIN | | | _OVERALL_ | Churn | FavoriteCategory | 0.069673 | 0.3026 | 4.8543 | 4 | INPUT | FavoriteCategory | 2 | 2 | 1 |
| TRAIN | | | _OVERALL_ | Churn | Occupation | 0.022952 | 0.9130 | 0.5268 | 3 | INPUT | Occupation | 3 | 3 | 1 |
| TRAIN | | | _OVERALL_ | Churn | MembershipLevel | 0.022880 | 0.9137 | 0.5235 | 3 | INPUT | MembershipLevel | 4 | 4 | 1 |
| TRAIN | | | _OVERALL_ | Churn | Gender | 0.022075 | 0.4851 | 0.4873 | 1 | INPUT | Gender | 5 | 5 | 1 |



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 | STRATIFY | DEFAULT | TestPct | 15 | 30 |
| ClassDistribution | Y | | OutputType | DATA | | TrainPct | 70 | 40 |
| IntervalDistribution | Y | | RandomSeed | 12345 | | ValidatePct | 15 | 30 |

Node=Data Partition Variable Summary

| Role | Level | Frequency Count | Name |
|--------|----------|--------------------|---|
| TARGET | BINARY | 1 | Churn |
| INPUT | INTERVAL | 4 | Age IMP_TotalPurchases IMP_TotalSpent WebsiteVisits |
| INPUT | NOMINAL | 5 | FavoriteCategory Gender Location MembershipLevel Occupation |
| ID | NOMINAL | 1 | CustomerID |

SAS Enterprise Miner Report

Node=Decision Tree1 Summary

Node id = Tree
Node label = Decision Tree1
Meta path = Ids => Stat => Impt => Stat2 => Part => Tree
Notes =

Node=Decision Tree1 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 Tree1 Variable Summary

| Role | Level | Frequency Count | Name |
|--------|----------|-----------------|---|
| TARGET | BINARY | 1 | Churn |
| INPUT | INTERVAL | 4 | Age IMP_TotalPurchases IMP_TotalSpent WebsiteVisits |
| INPUT | NOMINAL | 5 | FavoriteCategory Gender Location MembershipLevel Occupation |
| ID | INTERVAL | 1 | _dataobs_ |
| ID | NOMINAL | 1 | CustomerID |

Node=Decision Tree1 Model Fit Statistics

Target=Churn Target Label=' '

| Label of Statistic | Train | Validation | Test |
|----------------------------|---------|------------|---------|
| Sum of Frequencies | 700.00 | 149.000 | 151.000 |
| Misclassification Rate | 0.47 | 0.530 | 0.497 |
| Maximum Absolute Error | 0.59 | 0.595 | 0.595 |
| Sum of Squared Errors | 347.56 | 76.076 | 75.717 |
| Average Squared Error | 0.25 | 0.255 | 0.251 |
| Root Average Squared Error | 0.50 | 0.505 | 0.501 |
| Divisor for ASE | 1400.00 | 298.000 | 302.000 |
| Total Degrees of Freedom | 700.00 | . | . |

SAS Enterprise Miner Report

Node=Decision Tree1

Tree Diagram

N: 700 149

FavoriteC...

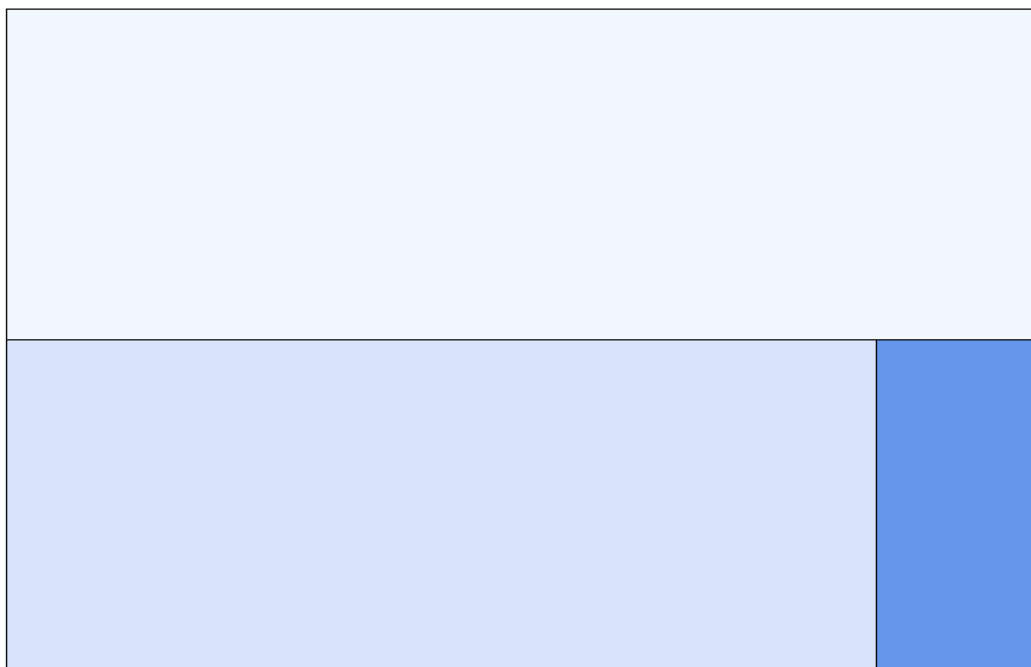
HOME G...

N: 589 128

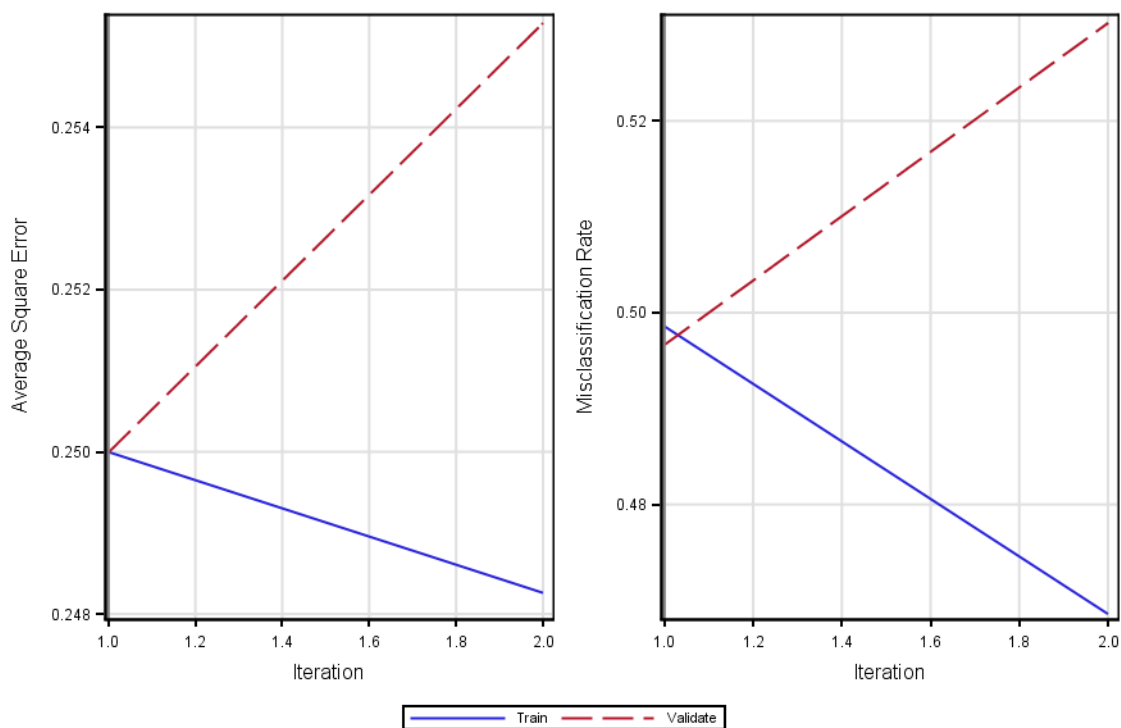
BOOKS

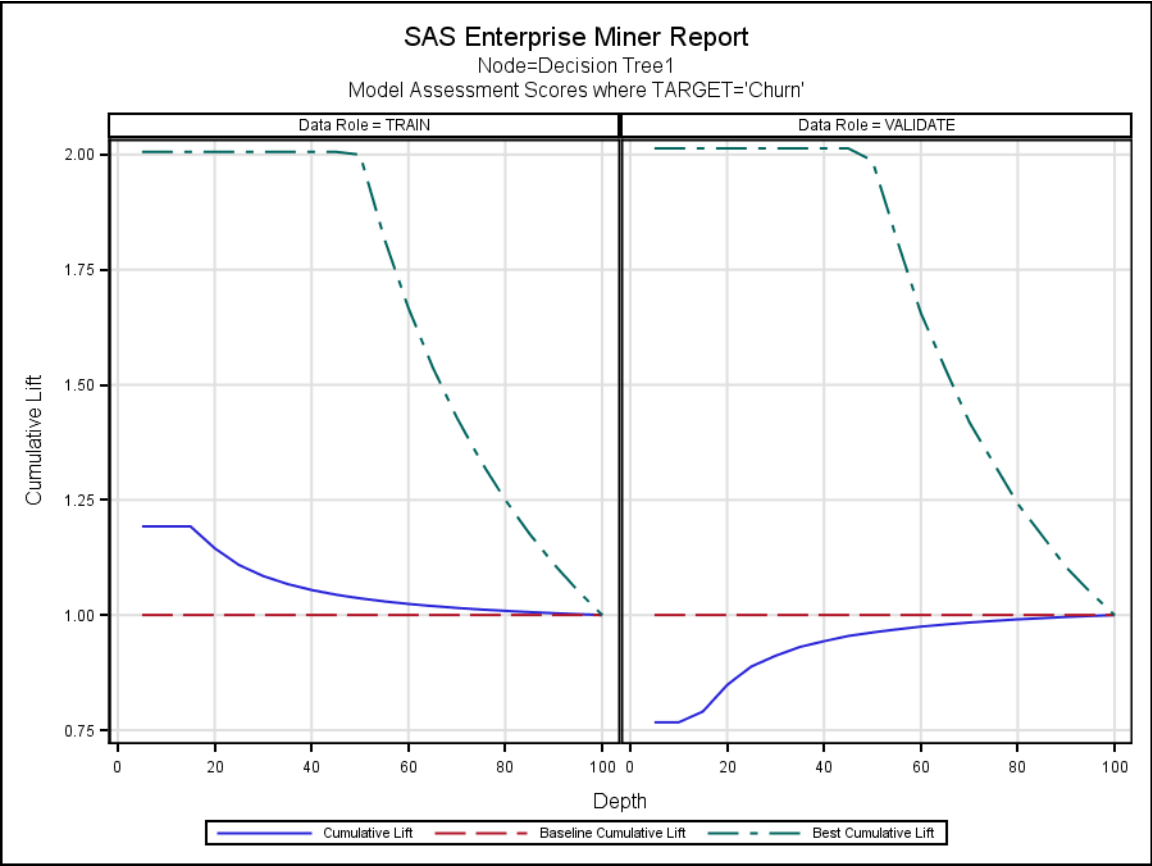
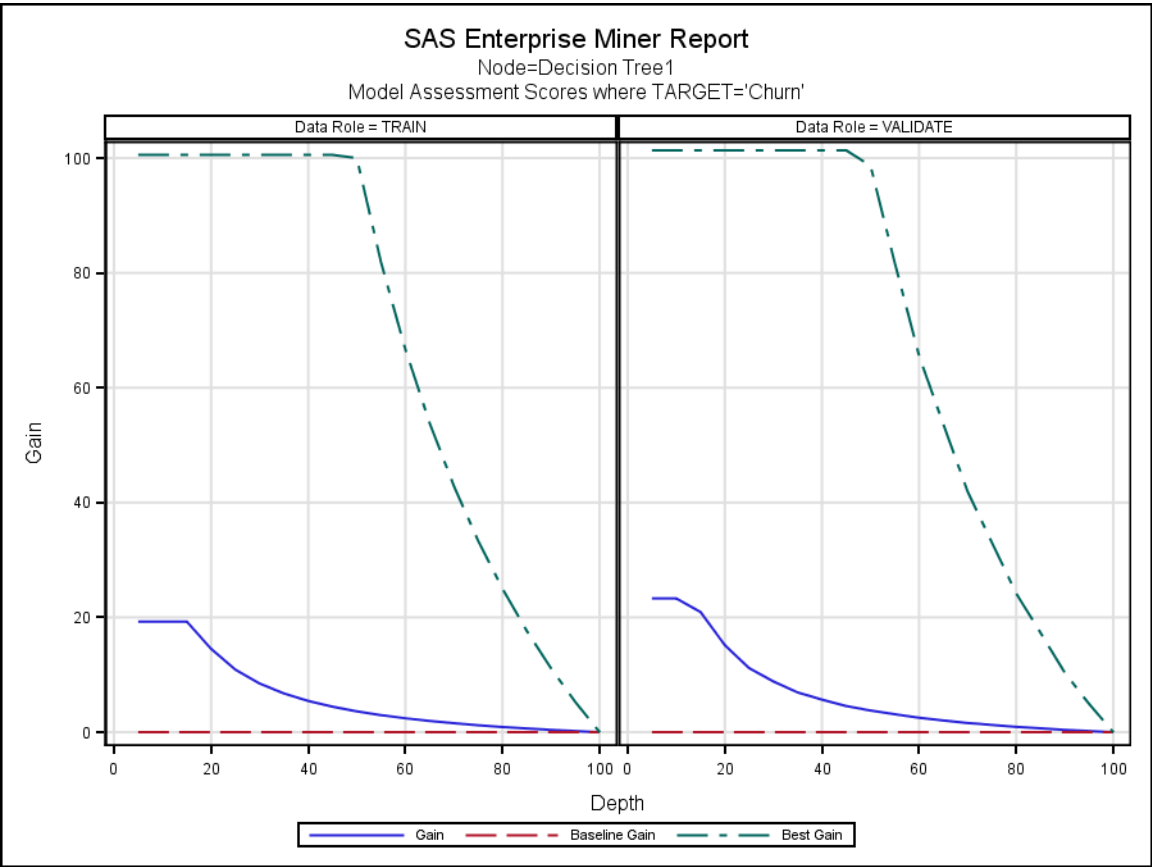
N: 111 21

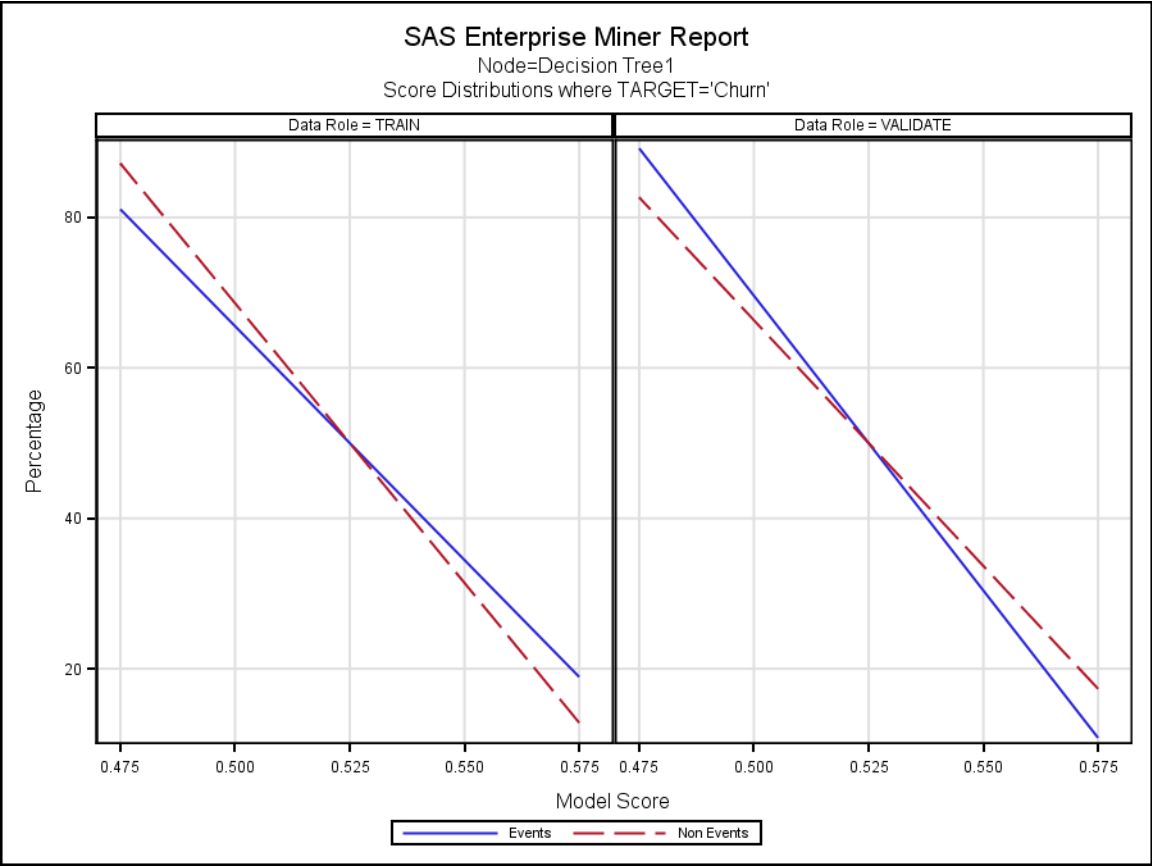
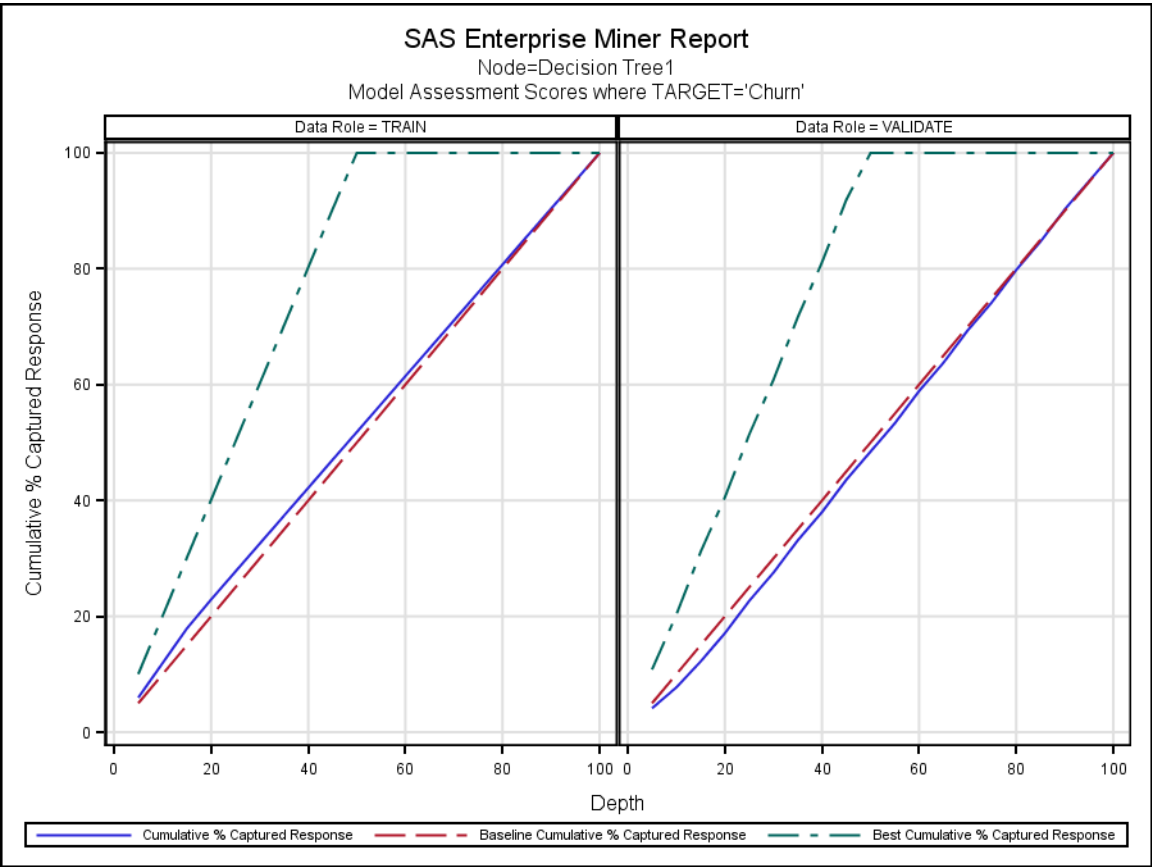
SAS Enterprise Miner Report
Node=Decision Tree1
Treemap

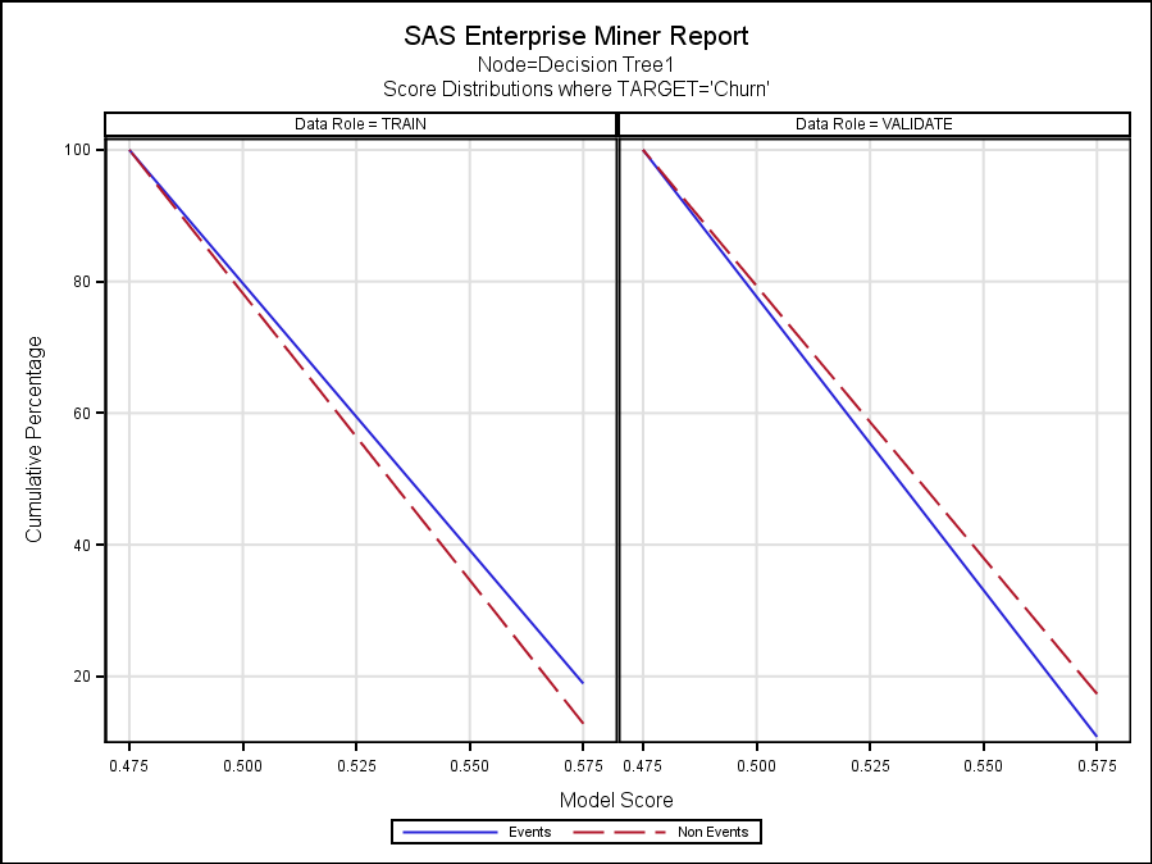


SAS Enterprise Miner Report
Node=Decision Tree1
Model Iteration Plots









Node=Decision Tree1
Score Distributions

Target Variable=Churn Data Role=TRAIN

| Posterior Probability Range | Number of Events | Percentage of Events | Percentage of Nonevents | Cumulative Percentage of Events | Cumulative Percentage of Nonevents |
|-----------------------------|------------------|----------------------|-------------------------|---------------------------------|------------------------------------|
| 0.55-0.60 | 66 | 18.9112 | 12.8205 | 18.911 | 12.821 |
| 0.45-0.50 | 283 | 81.0888 | 87.1795 | 100.000 | 100.000 |

Target Variable=Churn Data Role=VALIDATE

| Posterior Probability Range | Number of Events | Percentage of Events | Percentage of Nonevents | Cumulative Percentage of Events | Cumulative Percentage of Nonevents |
|-----------------------------|------------------|----------------------|-------------------------|---------------------------------|------------------------------------|
| 0.55-0.60 | 8 | 10.8108 | 17.3333 | 10.811 | 17.333 |
| 0.45-0.50 | 66 | 89.1892 | 82.6667 | 100.000 | 100.000 |

SAS Enterprise Miner Report

Node=Decision Tree (2) Summary

Node id = Tree2
 Node label = Decision Tree (2)
 Meta path = Ids => Stat => Impt => Stat2 => Part => 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 | ASE | 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 | |
| CVRRepeat | 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 | BINARY | 1 | Churn |
| INPUT | INTERVAL | 4 | Age IMP_TotalPurchases IMP_TotalSpent WebsiteVisits |
| INPUT | NOMINAL | 5 | FavoriteCategory Gender Location MembershipLevel Occupation |
| ID | INTERVAL | 1 | _dataobs_ |
| ID | NOMINAL | 1 | CustomerID |

Node=Decision Tree (2) Model Fit Statistics

Target=Churn Target Label=' '

| Label of Statistic | Train | Validation | Test |
|----------------------------|---------|------------|---------|
| Sum of Frequencies | 700.00 | 149.000 | 151.000 |
| Misclassification Rate | 0.47 | 0.530 | 0.497 |
| Maximum Absolute Error | 0.59 | 0.595 | 0.595 |
| Sum of Squared Errors | 347.56 | 76.076 | 75.717 |
| Average Squared Error | 0.25 | 0.255 | 0.251 |
| Root Average Squared Error | 0.50 | 0.505 | 0.501 |
| Divisor for ASE | 1400.00 | 298.000 | 302.000 |
| Total Degrees of Freedom | 700.00 | . | . |

SAS Enterprise Miner Report

Node=Decision Tree (2)

Tree Diagram

N: 700 149

FavoriteC...

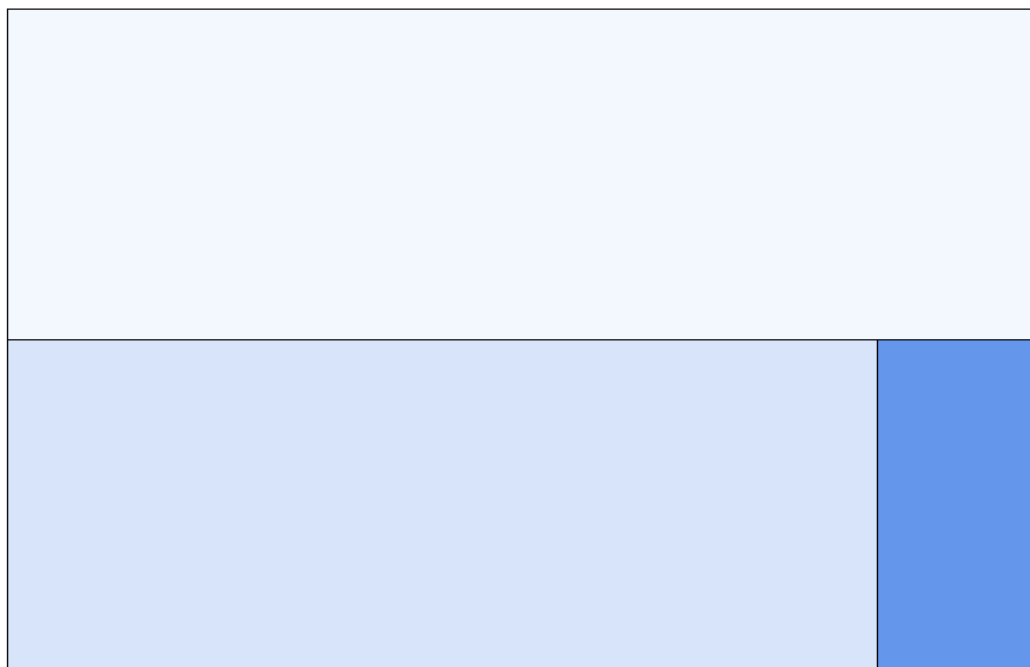
HOME G...

N: 589 128

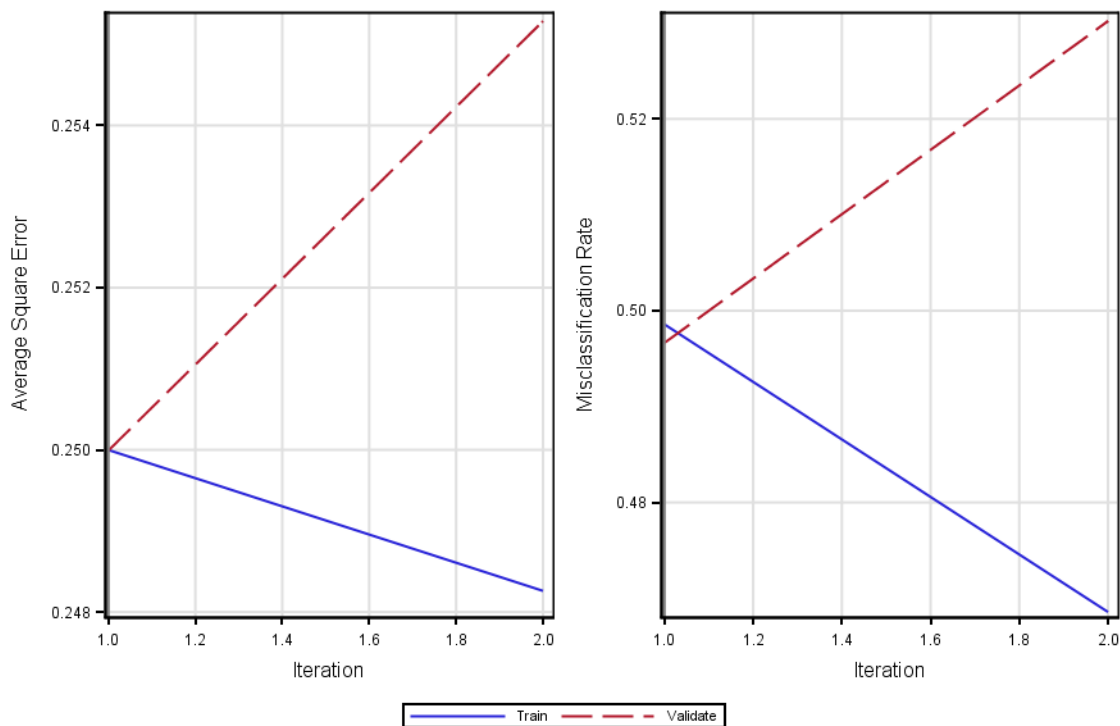
BOOKS

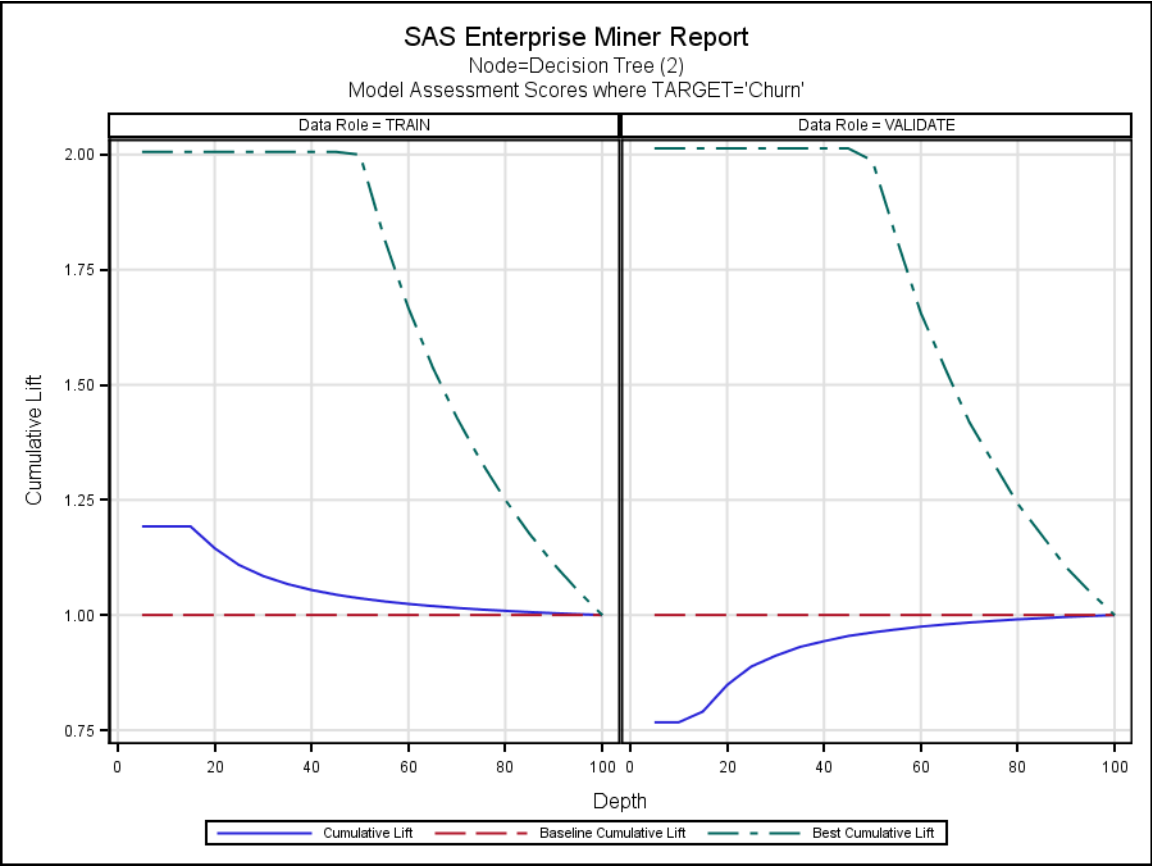
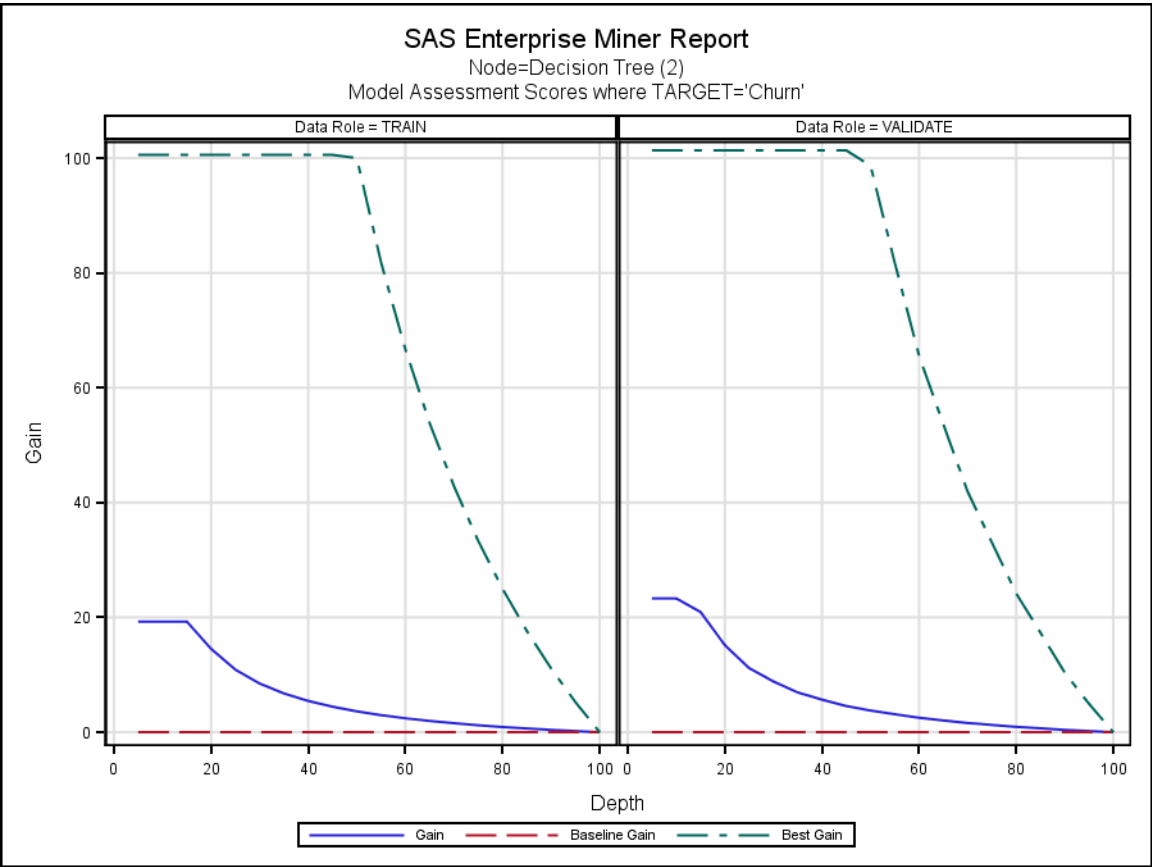
N: 111 21

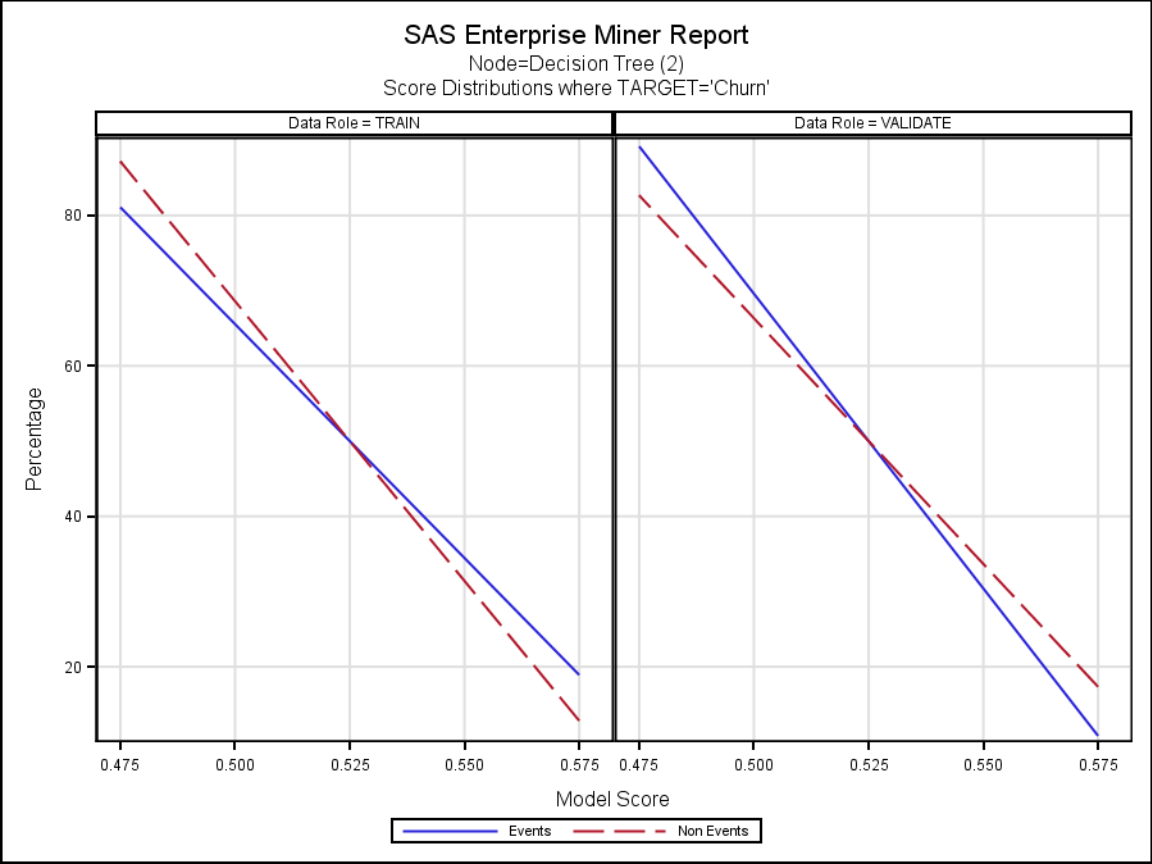
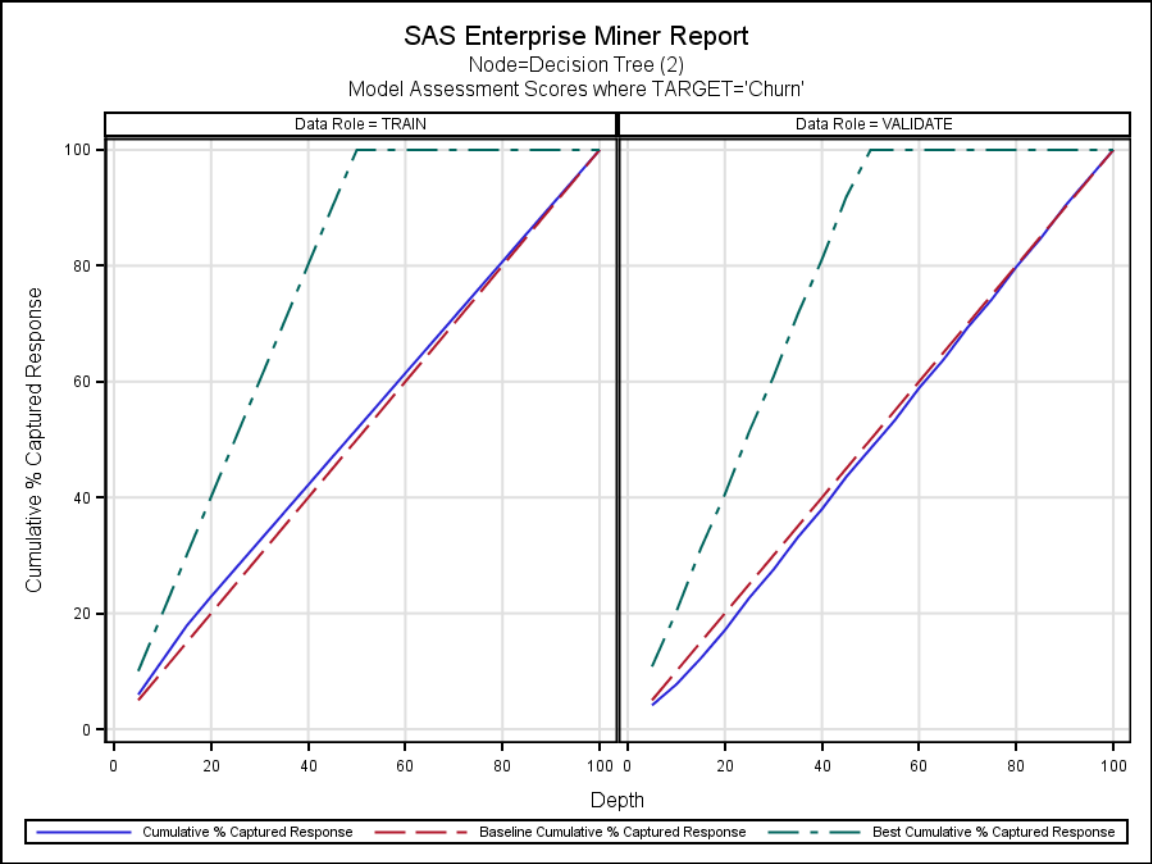
SAS Enterprise Miner Report
Node=Decision Tree (2)
Treemap

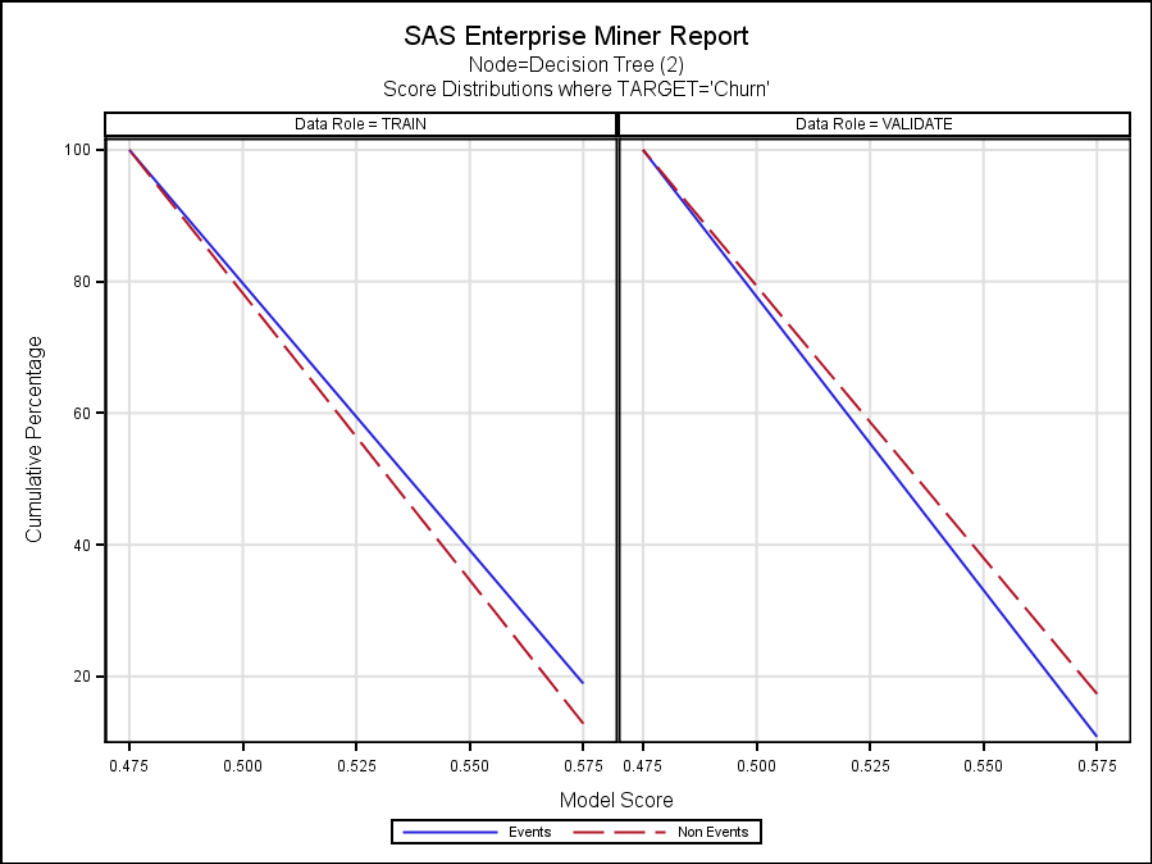


SAS Enterprise Miner Report
Node=Decision Tree (2)
Model Iteration Plots









Node=Decision Tree (2)
Score Distributions

Target Variable=Churn Data Role=TRAIN

| Posterior Probability Range | Number of Events | Percentage of Events | Percentage of Nonevents | Cumulative Percentage of Events | Cumulative Percentage of Nonevents |
|-----------------------------|------------------|----------------------|-------------------------|---------------------------------|------------------------------------|
| 0.55-0.60 | 66 | 18.9112 | 12.8205 | 18.911 | 12.821 |
| 0.45-0.50 | 283 | 81.0888 | 87.1795 | 100.000 | 100.000 |

Target Variable=Churn Data Role=VALIDATE

| Posterior Probability Range | Number of Events | Percentage of Events | Percentage of Nonevents | Cumulative Percentage of Events | Cumulative Percentage of Nonevents |
|-----------------------------|------------------|----------------------|-------------------------|---------------------------------|------------------------------------|
| 0.55-0.60 | 8 | 10.8108 | 17.3333 | 10.811 | 17.333 |
| 0.45-0.50 | 66 | 89.1892 | 82.6667 | 100.000 | 100.000 |

SAS Enterprise Miner Report

Node=Decision Tree (3) Summary

Node id = Tree3
 Node label = Decision Tree (3)
 Meta path = Ids => Stat => Impt => Stat2 => Part => 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 | MISC | 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 | |
| CVRRepeat | 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 | BINARY | 1 | Churn |
| INPUT | INTERVAL | 4 | Age IMP_TotalPurchases IMP_TotalSpent WebsiteVisits |
| INPUT | NOMINAL | 5 | FavoriteCategory Gender Location MembershipLevel Occupation |
| ID | INTERVAL | 1 | _dataobs_ |
| ID | NOMINAL | 1 | CustomerID |

Node=Decision Tree (3) Model Fit Statistics

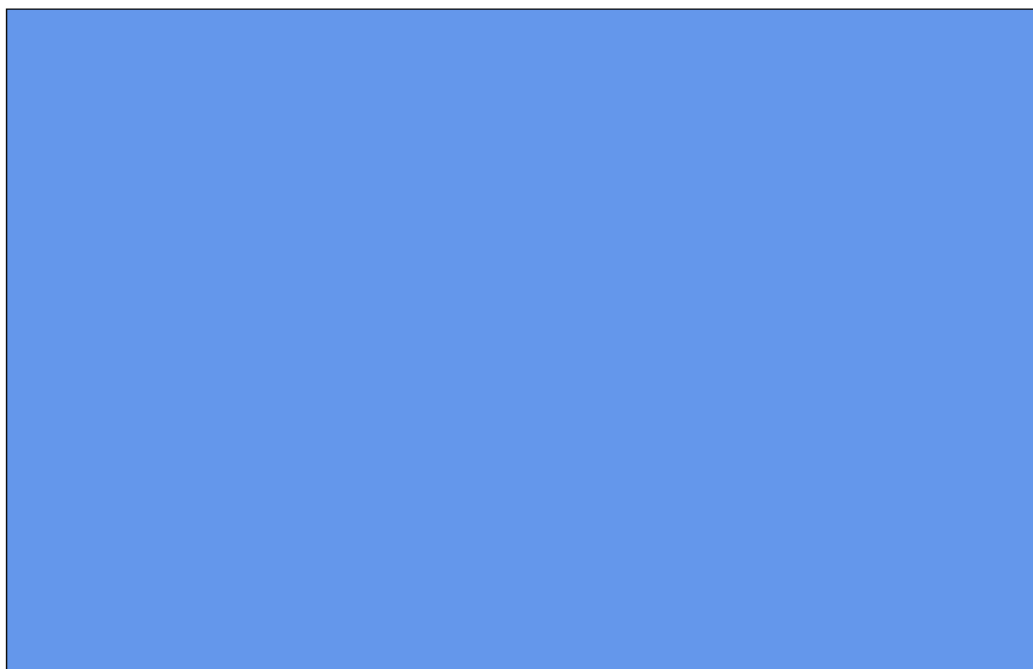
Target=Churn Target Label=' '

| Label of Statistic | Train | Validation | Test |
|----------------------------|---------|------------|---------|
| Sum of Frequencies | 700.00 | 149.000 | 151.000 |
| Misclassification Rate | 0.50 | 0.497 | 0.503 |
| Maximum Absolute Error | 0.50 | 0.501 | 0.501 |
| Sum of Squared Errors | 350.00 | 74.498 | 75.503 |
| Average Squared Error | 0.25 | 0.250 | 0.250 |
| Root Average Squared Error | 0.50 | 0.500 | 0.500 |
| Divisor for ASE | 1400.00 | 298.000 | 302.000 |
| Total Degrees of Freedom | 700.00 | . | . |

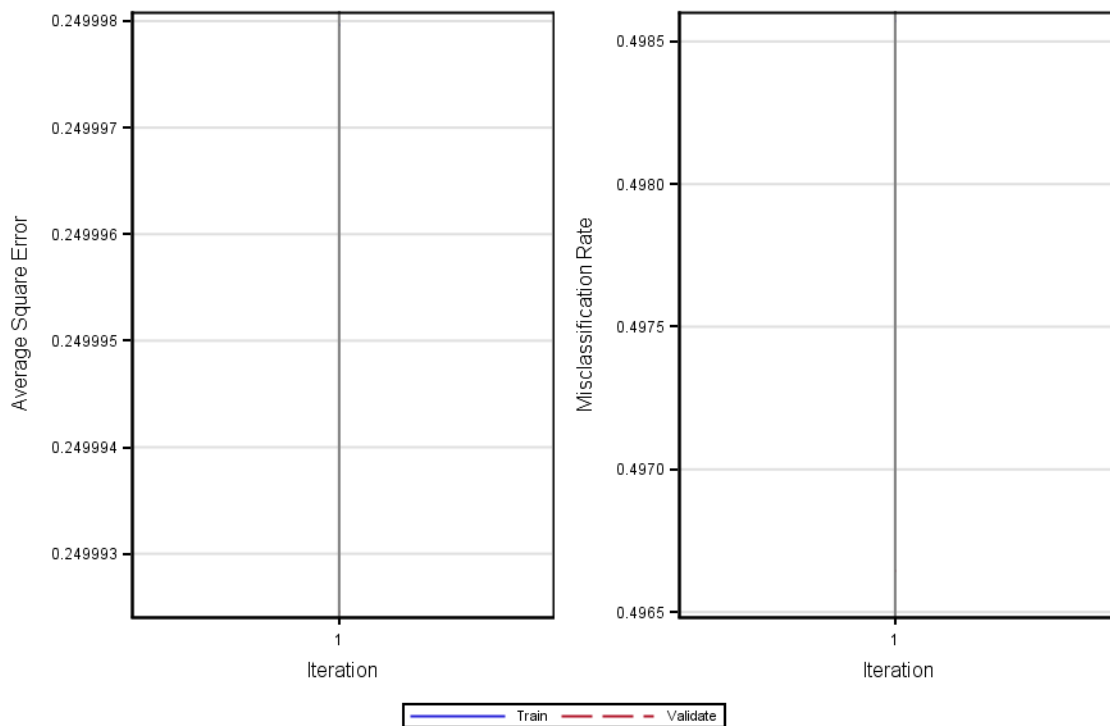
SAS Enterprise Miner Report
Node=Decision Tree (3)
Tree Diagram

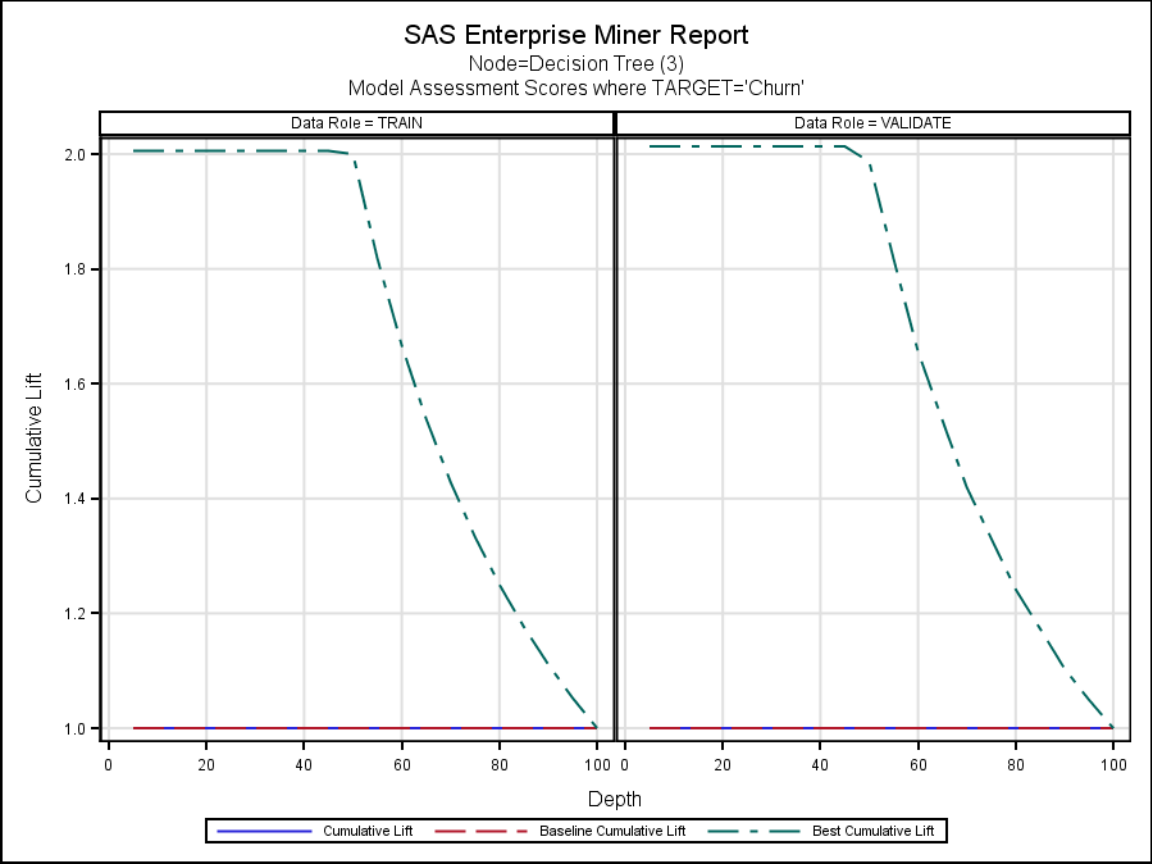
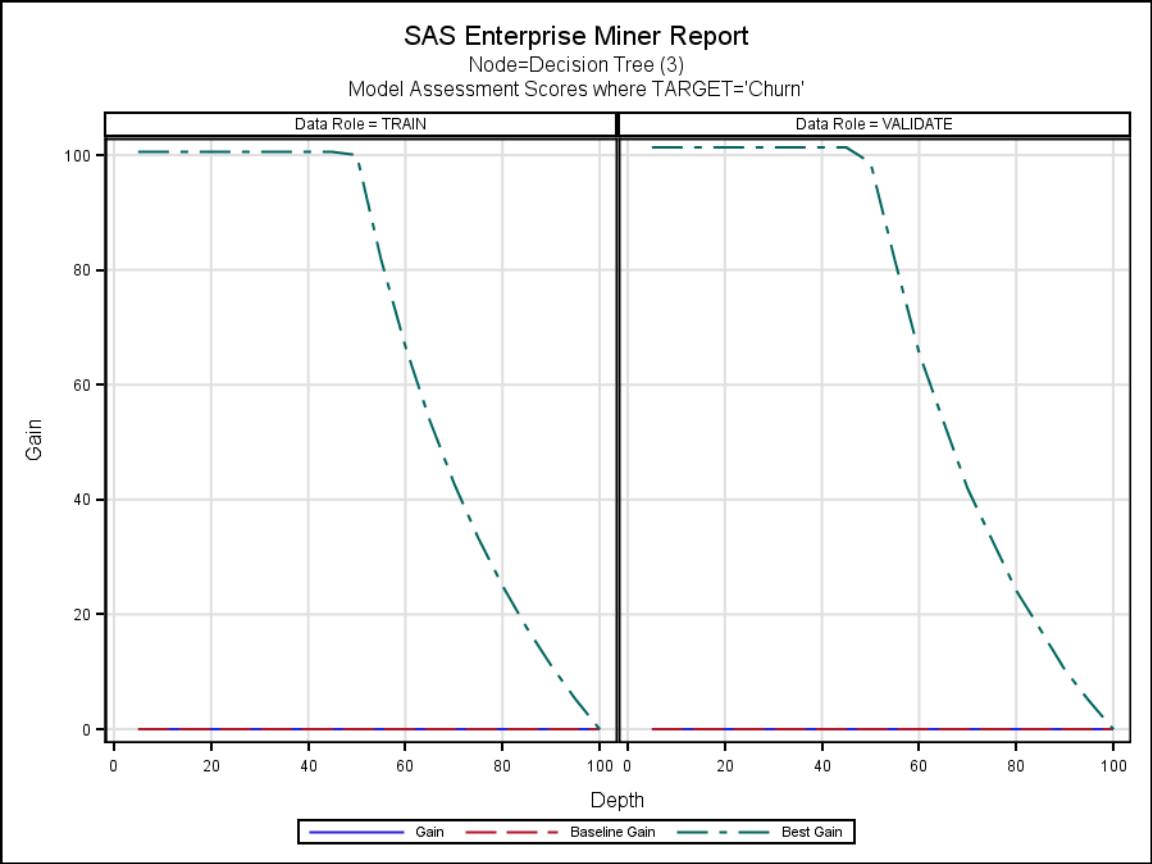
N: 700 149

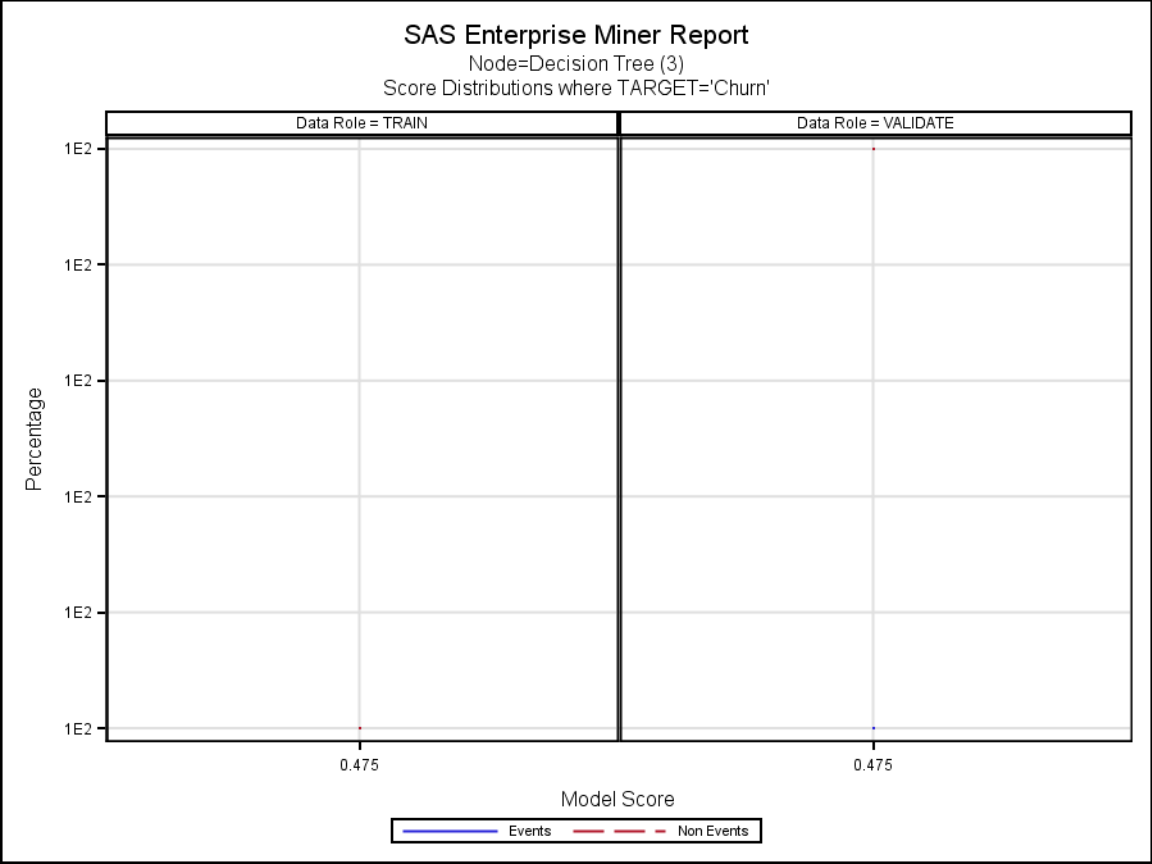
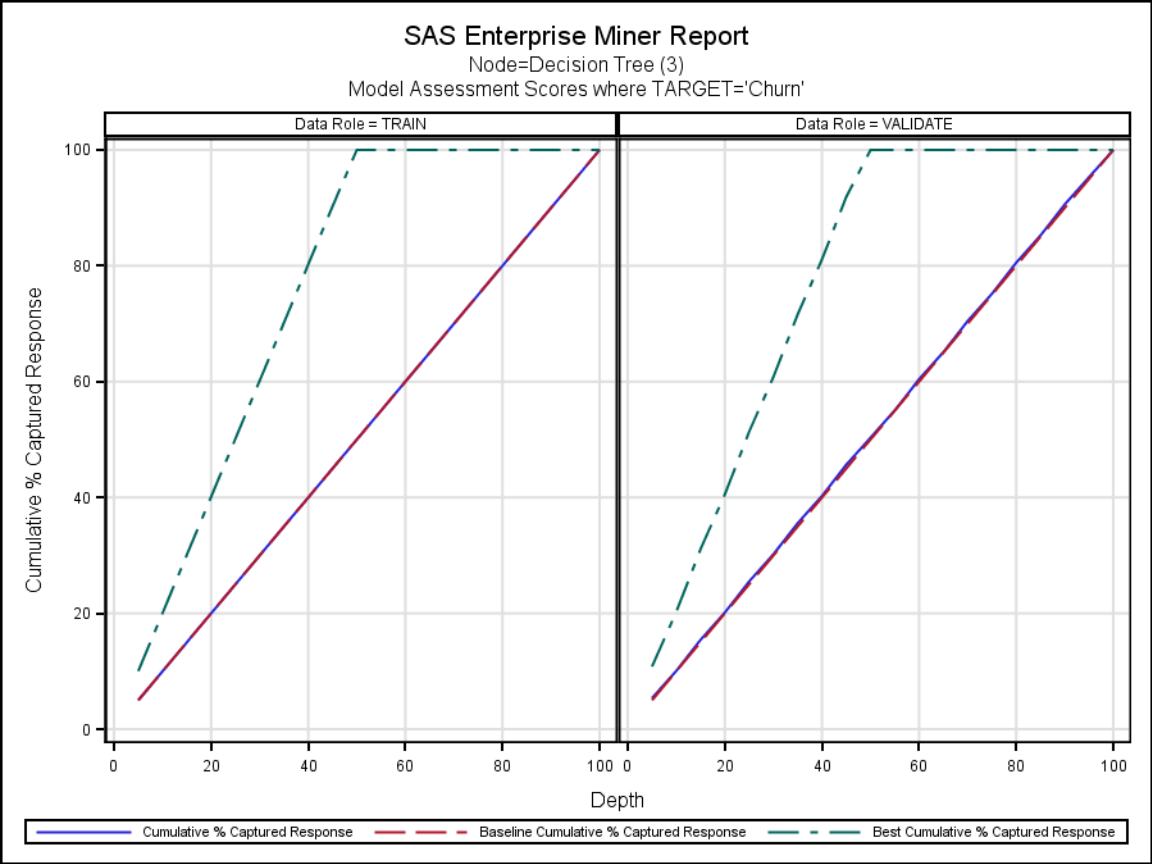
SAS Enterprise Miner Report
Node=Decision Tree (3)
Treemap

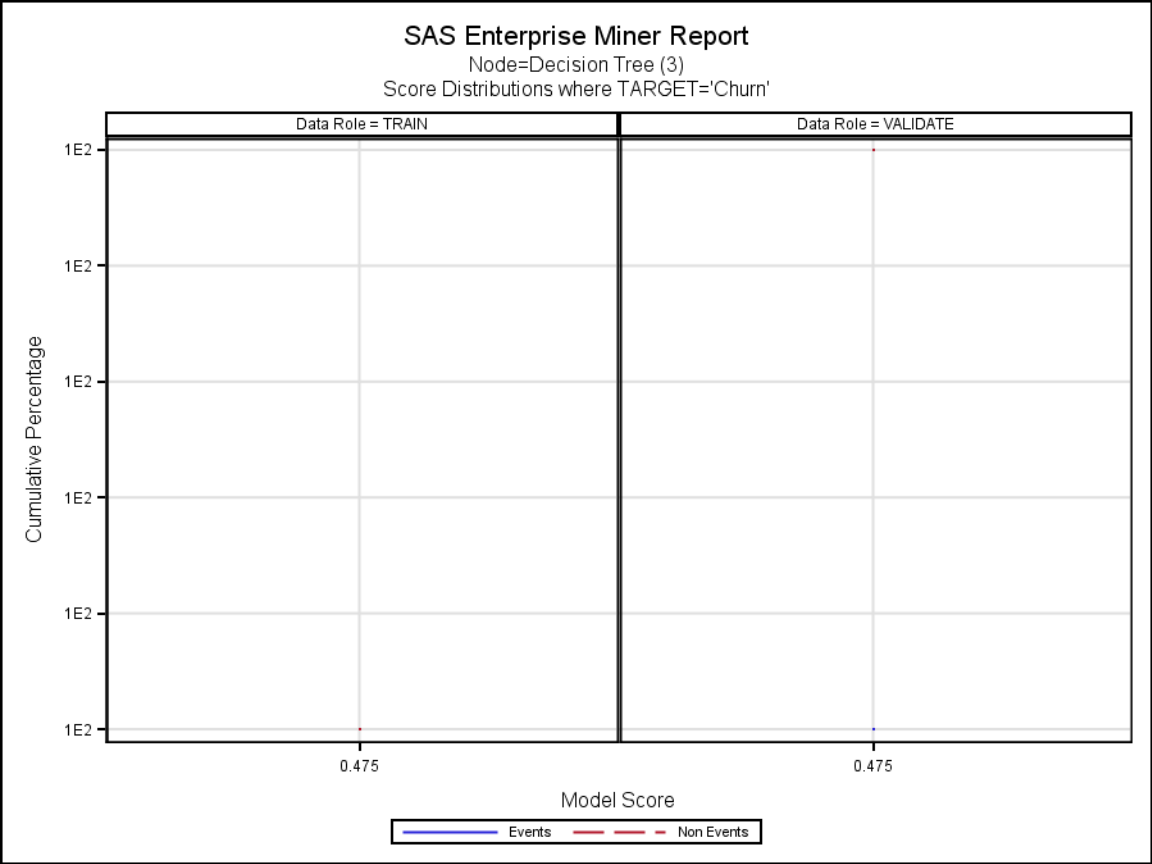


SAS Enterprise Miner Report
Node=Decision Tree (3)
Model Iteration Plots









Node=Decision Tree (3)
Score Distributions

Target Variable=Churn Data Role=TRAIN

| Posterior Probability Range | Number of Events | Percentage of Events | Percentage of Nonevents | Cumulative Percentage of Events | Cumulative Percentage of Nonevents |
|-----------------------------|------------------|----------------------|-------------------------|---------------------------------|------------------------------------|
| 0.45-0.50 | 349 | 100 | 100 | 100 | 100 |

Target Variable=Churn Data Role=VALIDATE

| Posterior Probability Range | Number of Events | Percentage of Events | Percentage of Nonevents | Cumulative Percentage of Events | Cumulative Percentage of Nonevents |
|-----------------------------|------------------|----------------------|-------------------------|---------------------------------|------------------------------------|
| 0.45-0.50 | 74 | 100 | 100 | 100 | 100 |

SAS Enterprise Miner Report

Node=Decision Tree (4) Summary

Node id = Tree4
 Node label = Decision Tree (4)
 Meta path = Ids => Stat => Impt => Stat2 => Part => 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 | BINARY | 1 | Churn |
| INPUT | INTERVAL | 4 | Age IMP_TotalPurchases IMP_TotalSpent WebsiteVisits |
| INPUT | NOMINAL | 5 | FavoriteCategory Gender Location MembershipLevel Occupation |
| ID | INTERVAL | 1 | _dataobs_ |
| ID | NOMINAL | 1 | CustomerID |

Node=Decision Tree (4) Model Fit Statistics

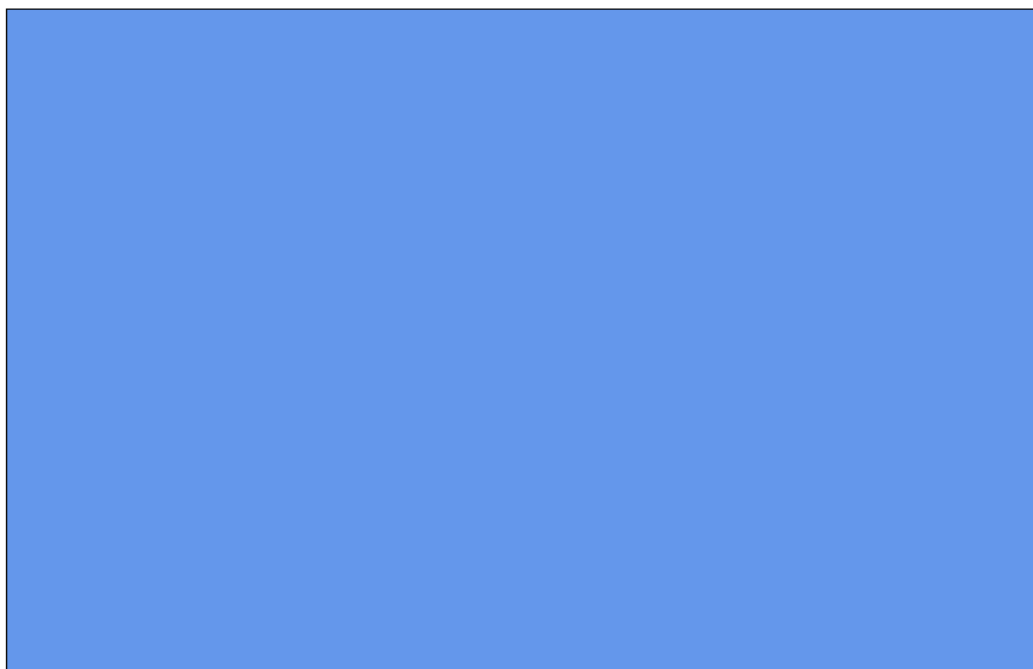
Target=Churn Target Label=' '

| Label of Statistic | Train | Validation | Test |
|----------------------------|---------|------------|---------|
| Sum of Frequencies | 700.00 | 149.000 | 151.000 |
| Misclassification Rate | 0.50 | 0.497 | 0.503 |
| Maximum Absolute Error | 0.50 | 0.501 | 0.501 |
| Sum of Squared Errors | 350.00 | 74.498 | 75.503 |
| Average Squared Error | 0.25 | 0.250 | 0.250 |
| Root Average Squared Error | 0.50 | 0.500 | 0.500 |
| Divisor for ASE | 1400.00 | 298.000 | 302.000 |
| Total Degrees of Freedom | 700.00 | . | . |

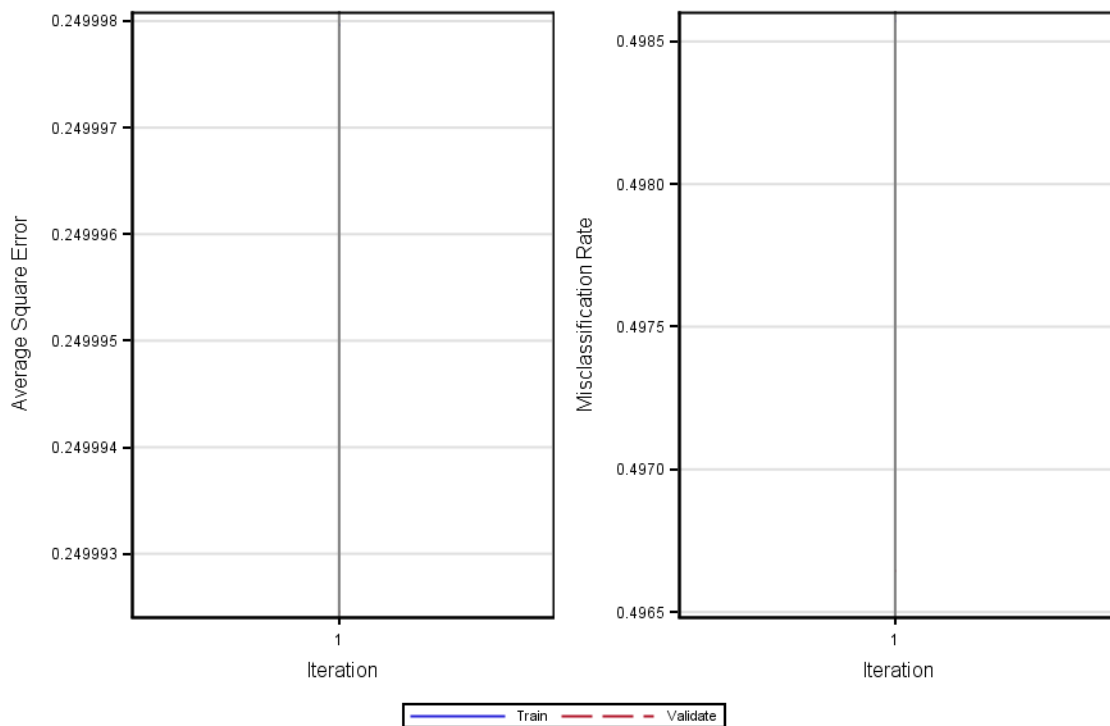
SAS Enterprise Miner Report
Node=Decision Tree (4)
Tree Diagram

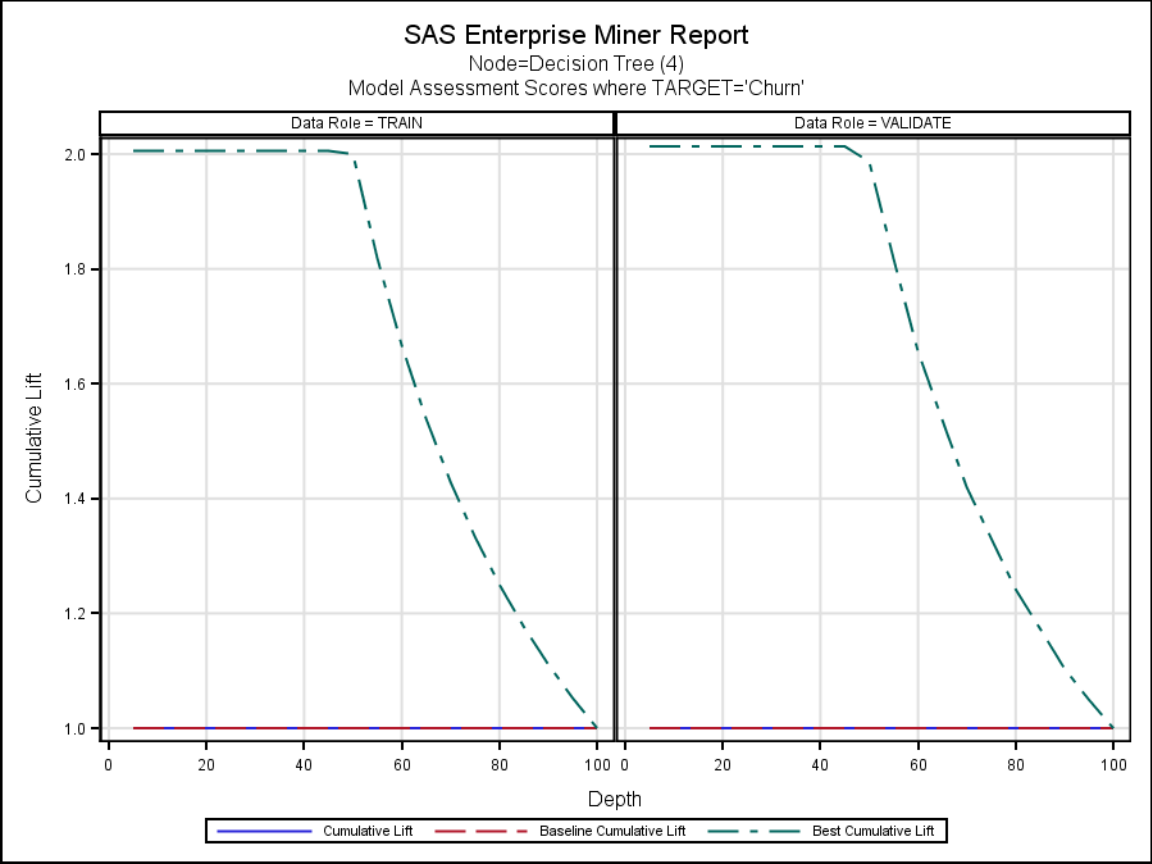
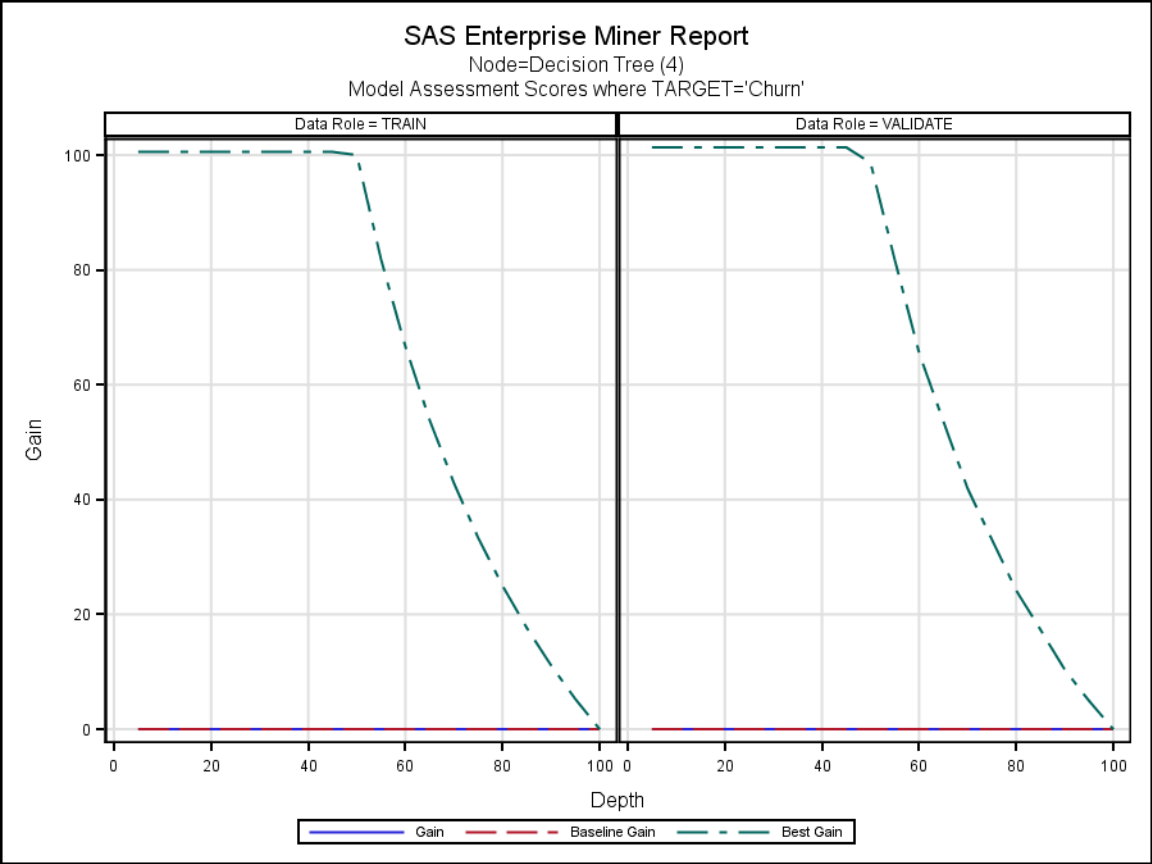
N: 700 149

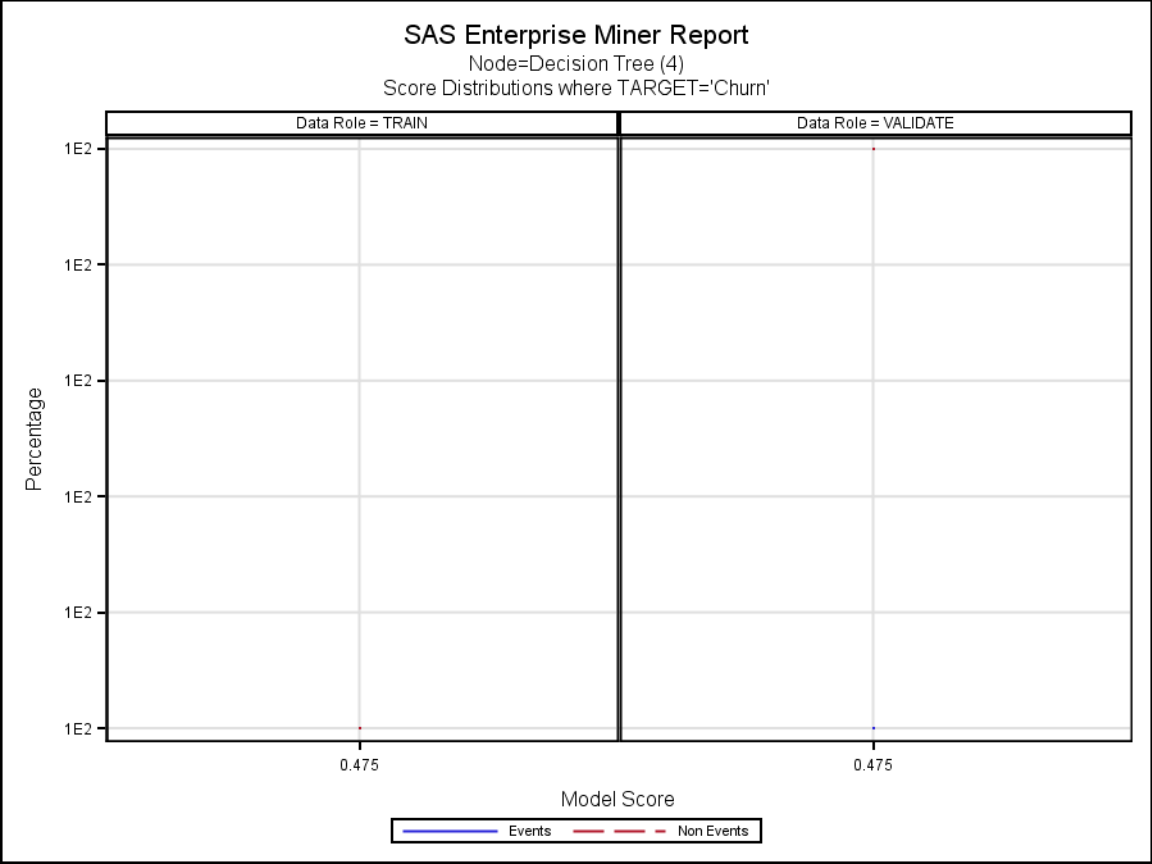
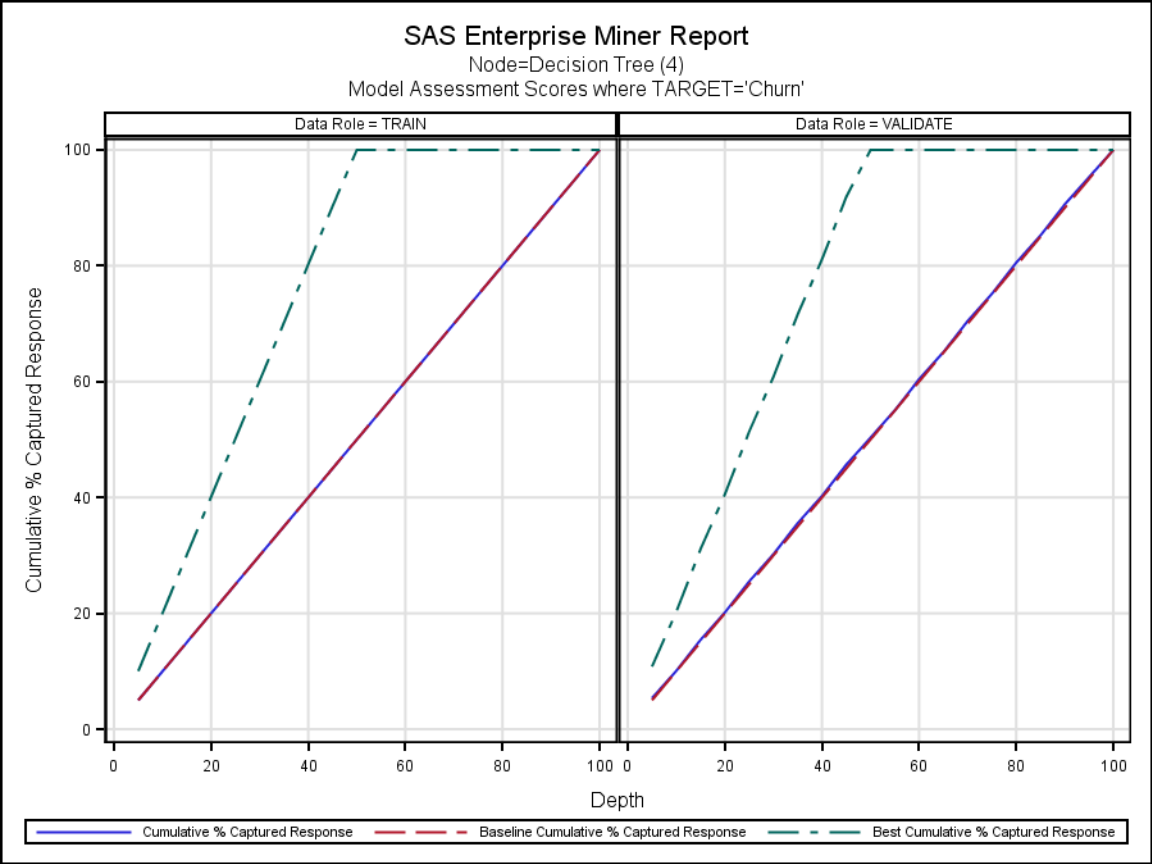
SAS Enterprise Miner Report
Node=Decision Tree (4)
Treemap

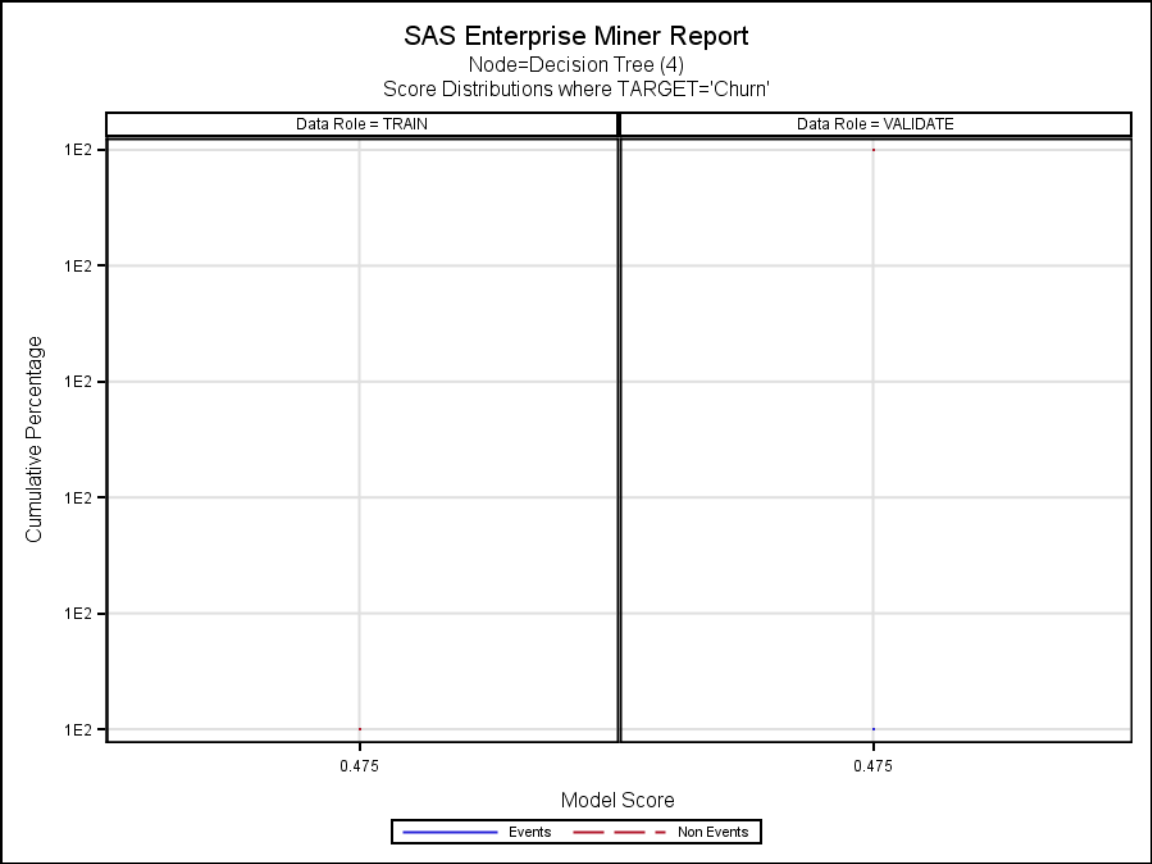


SAS Enterprise Miner Report
Node=Decision Tree (4)
Model Iteration Plots









Node=Decision Tree (4)
Score Distributions

Target Variable=Churn Data Role=TRAIN

| Posterior Probability Range | Number of Events | Percentage of Events | Percentage of Nonevents | Cumulative Percentage of Events | Cumulative Percentage of Nonevents |
|-----------------------------|------------------|----------------------|-------------------------|---------------------------------|------------------------------------|
| 0.45-0.50 | 349 | 100 | 100 | 100 | 100 |

Target Variable=Churn Data Role=VALIDATE

| Posterior Probability Range | Number of Events | Percentage of Events | Percentage of Nonevents | Cumulative Percentage of Events | Cumulative Percentage of Nonevents |
|-----------------------------|------------------|----------------------|-------------------------|---------------------------------|------------------------------------|
| 0.45-0.50 | 74 | 100 | 100 | 100 | 100 |

SAS Enterprise Miner Report

Node=Model Comparison
Summary

Node id = MdlComp2
Node label = Model Comparison
Meta path = Ids2 => Stat3 => Impt2 => Stat4 => Part2 => Boost => MdlComp2
Notes =

Node=Model Comparison
Properties

| Property | Value | Default | Property | Value | Default | Property | Value | Default |
|-----------------------|-------------------------------|---------|-----------------------------|-------|---------|-------------------|---------|---------|
| Component | ModelCompare | | NormalizeReportingVariables | Y | | ScoreDistBin | 20 | |
| AssessAllTargetLevels | N | | NumberOfReportedLevels | 1E-6 | | SelectionCriteria | DEFAULT | |
| DecileBin | 20 | | NumberOfBins | 20 | | SelectionData | DEFAULT | |
| HPCriteria | DEFAULT | | ProfitEpsilon | 1E-6 | | SelectionDepth | 10 | |
| LiftEpsilon | 1E-6 | | RecomputeAssess | N | | SelectionTable | TRAIN | TABLE |
| ModelCriteria | Valid: Misclassification Rate | | RocChart | Y | | StatisticUsed | _VMISC_ | |
| ModelDescription | Gradient Boosting | | RocEpsilon | 0.01 | | TargetLabel | | |
| ModelId | Boost | | RoiEpsilon | 1E-6 | | TargetName | Churn | |

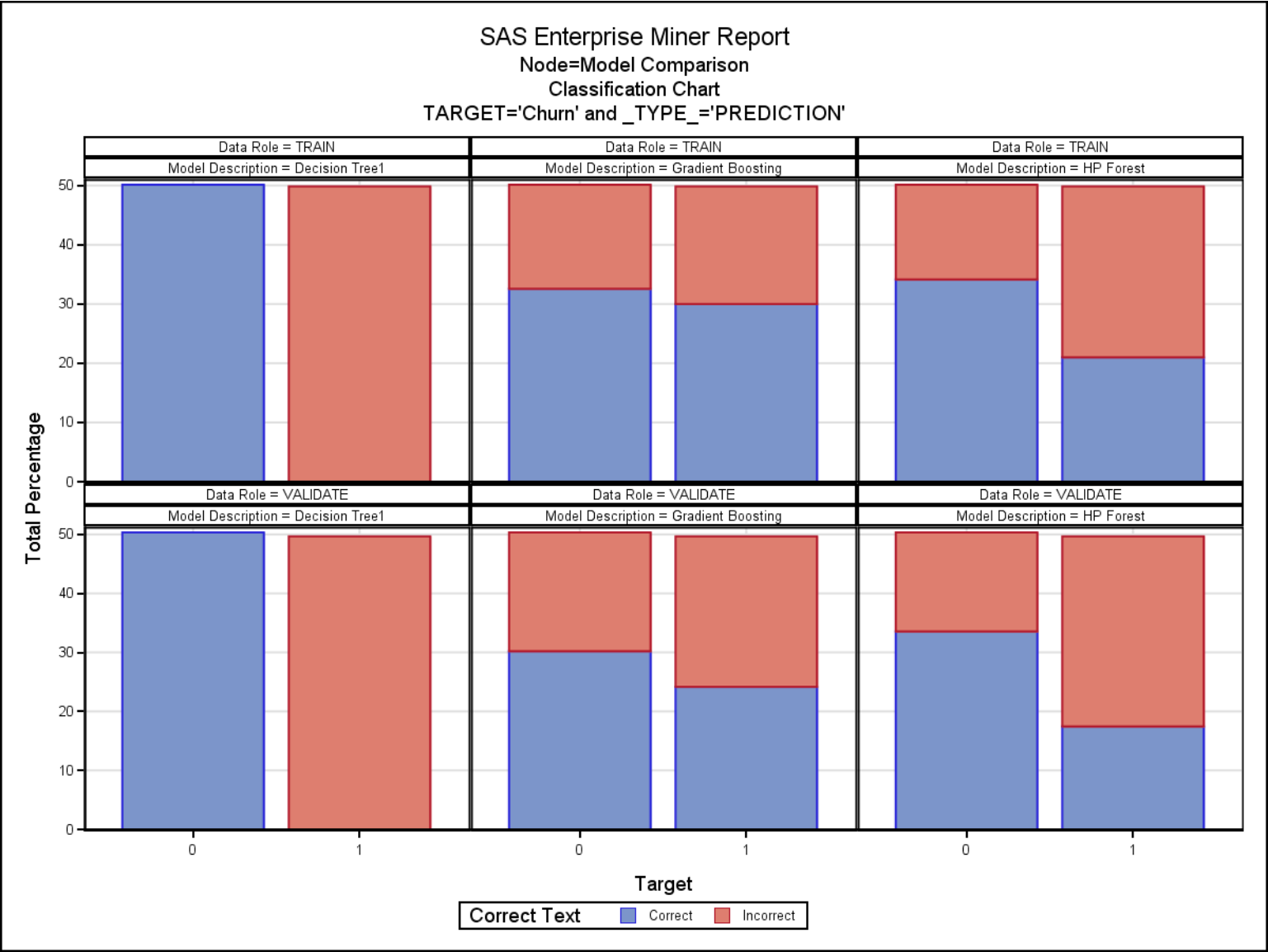
Node=Model Comparison
Variable Summary

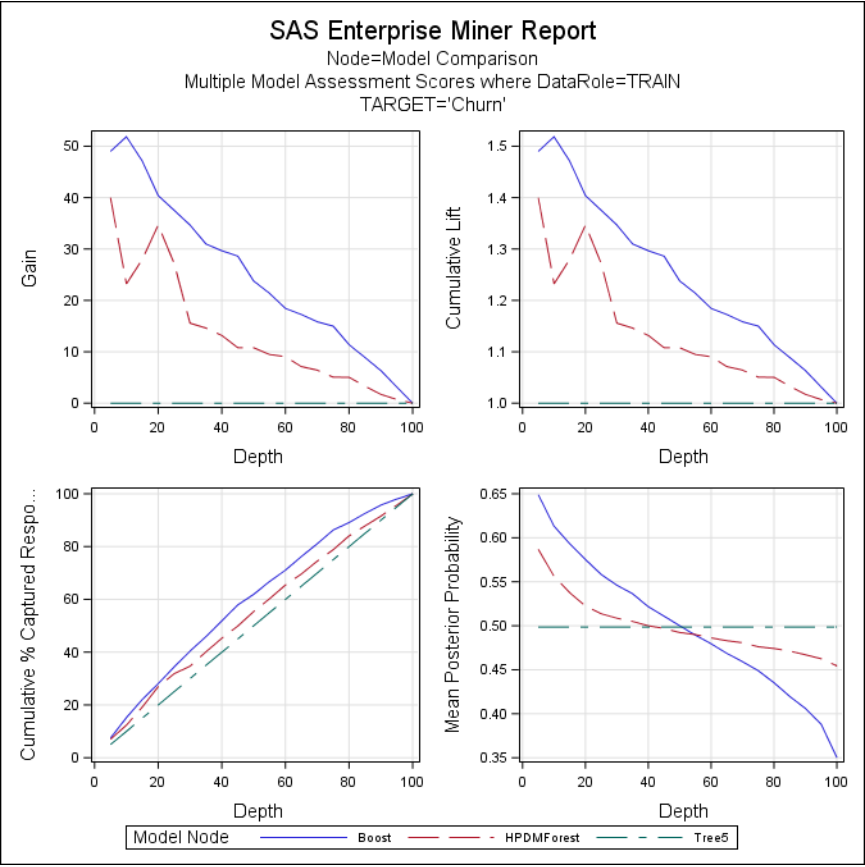
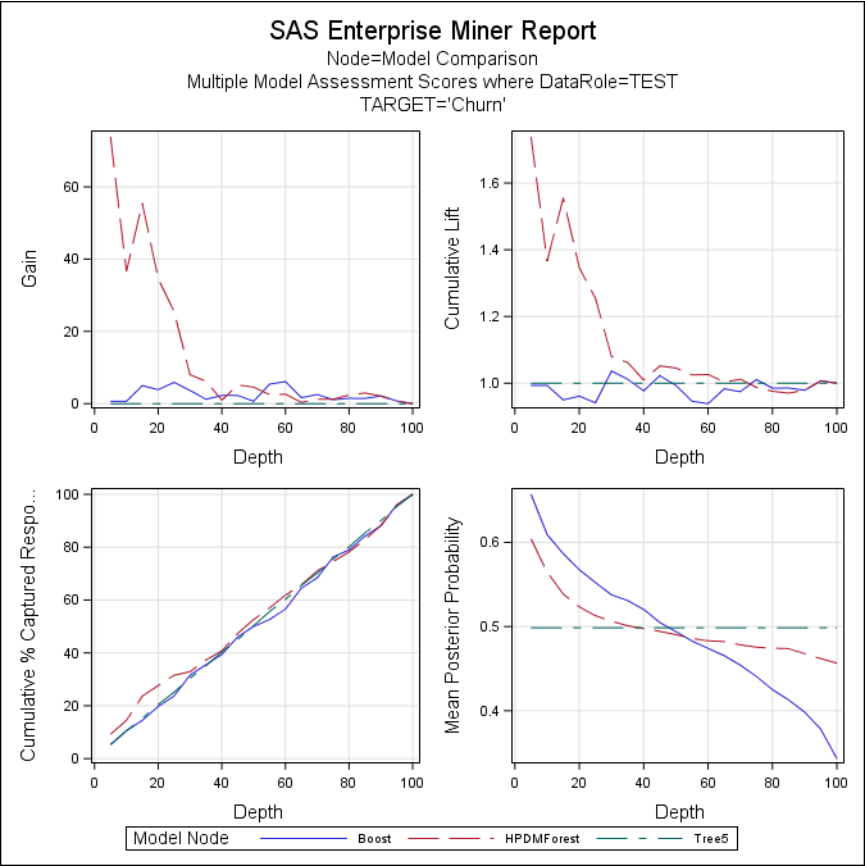
| Role | Level | Frequency Count | Name |
|--------|--------|-----------------|-------|
| TARGET | BINARY | 1 | Churn |

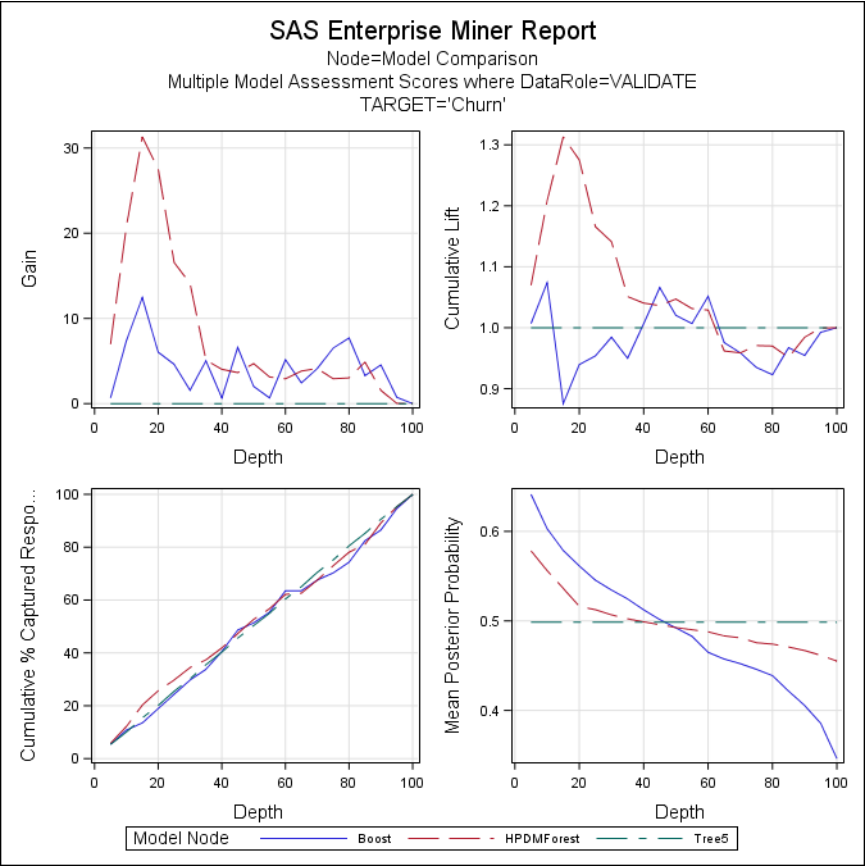
Node=Model Comparison
Fit Statistics Table

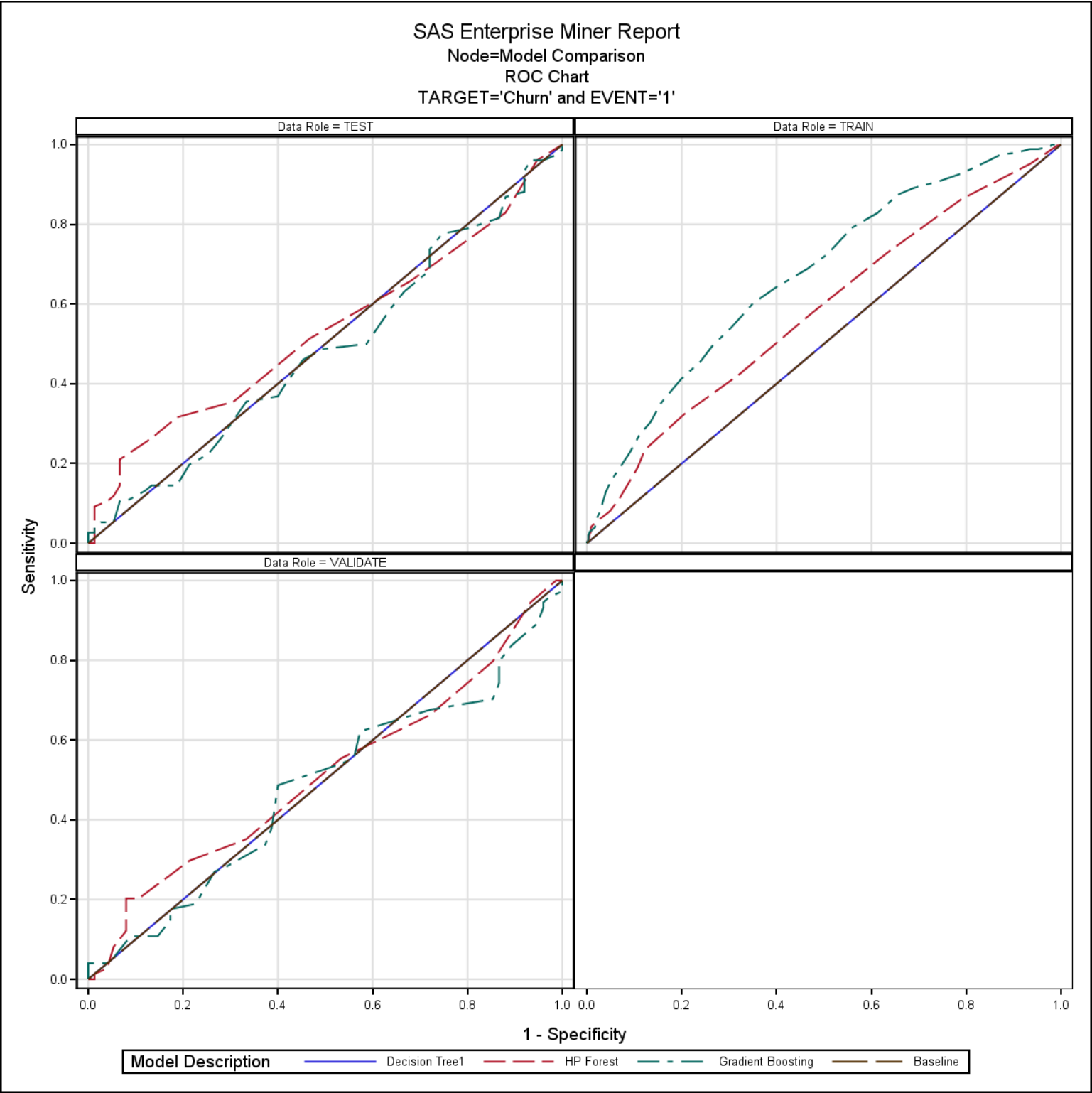
| Selected Model | Predecessor Node | Model Node | Model Description | Target Variable | Target Label | Selection Criterion: Valid: Misclassification Rate | Train: Average Squared Error | Train: Misclassification Rate | Train: Kolmogorov-Smirnov Statistic |
|----------------|------------------|------------|-------------------|-----------------|--------------|--|------------------------------|-------------------------------|-------------------------------------|
| Y | Boost | Boost | Gradient Boosting | Churn | | 0.45638 | 0.23267 | 0.37429 | 0.251 |
| | HPDMForest | HPDMForest | HP Forest | Churn | | 0.48993 | 0.24612 | 0.44857 | 0.119 |
| | Tree5 | Tree5 | Decision Tree1 | Churn | | 0.49664 | 0.25000 | 0.49857 | 0.000 |

| Selected Model | Predecessor Node | Model Node | Model Description | Target Variable | Target Label | Selection Criterion: Valid: Misclassification Rate | Valid: Average Squared Error | Valid: Misclassification Rate | Valid: Kolmogorov-Smirnov Statistic |
|----------------|------------------|------------|-------------------|-----------------|--------------|--|------------------------------|-------------------------------|-------------------------------------|
| Y | Boost | Boost | Gradient Boosting | Churn | | 0.45638 | 0.25801 | 0.45638 | 0.151 |
| | HPDMForest | HPDMForest | HP Forest | Churn | | 0.48993 | 0.24902 | 0.48993 | 0.123 |
| | Tree5 | Tree5 | Decision Tree1 | Churn | | 0.49664 | 0.24999 | 0.49664 | 0.000 |









SAS Enterprise Miner Report

Node=Model Comparison Summary

Node id = MdlComp
Node label = Model Comparison
Meta path = Ids => Stat => Impt => Stat2 => Part => Tree3 => MdlComp
Notes =

Node=Model Comparison Properties

| Property | Value | Default | Property | Value | Default | Property | Value | Default |
|-----------------------|-------------------------------|---------|-----------------------------|-------|---------|-------------------|---------|---------|
| Component | ModelCompare | | NormalizeReportingVariables | Y | | ScoreDistBin | 20 | |
| AssessAllTargetLevels | N | | NumberOfReportedLevels | 1E-6 | | SelectionCriteria | DEFAULT | |
| DecileBin | 20 | | NumberOfBins | 20 | | SelectionData | DEFAULT | |
| HPCriteria | DEFAULT | | ProfitEpsilon | 1E-6 | | SelectionDepth | 10 | |
| LiftEpsilon | 1E-6 | | RecomputeAssess | N | | SelectionTable | TRAIN | TABLE |
| ModelCriteria | Valid: Misclassification Rate | | RocChart | Y | | StatisticUsed | _VMISC_ | |
| ModelDescription | Decision Tree (3) | | RocEpsilon | 0.01 | | TargetLabel | | |
| ModelId | Tree3 | | RoiEpsilon | 1E-6 | | TargetName | Churn | |

Node=Model Comparison Variable Summary

| Role | Level | Frequency Count | Name |
|--------|--------|--------------------|-------|
| TARGET | BINARY | 1 | Churn |

Node=Model Comparison Fit Statistics Table

| Selected Model | Predecessor Node | Model Node | Model Description | Target Variable | Target Label | Selection Criterion: Valid: Misclassification Rate | Train: Average Squared Error | Train: Misclassification Rate | Train: Kolmogorov-Smirnov Statistic |
|-------------------|---------------------|---------------|-------------------|--------------------|-----------------|---|---------------------------------------|-------------------------------------|---|
| Y | Tree3 | Tree3 | Decision Tree (3) | Churn | | 0.49664 | 0.25000 | 0.49857 | 0.000 |
| | Tree4 | Tree4 | Decision Tree (4) | Churn | | 0.49664 | 0.25000 | 0.49857 | 0.000 |
| | Tree | Tree | Decision Tree1 | Churn | | 0.53020 | 0.24826 | 0.46857 | 0.061 |
| | Tree2 | Tree2 | Decision Tree (2) | Churn | | 0.53020 | 0.24826 | 0.46857 | 0.061 |

| Selected Model | Predecessor Node | Model Node | Model Description | Target Variable | Target Label | Selection Criterion: Valid: Misclassification Rate | Valid: Average Squared Error | Valid: Misclassification Rate | Valid: Kolmogorov-Smirnov Statistic |
|-------------------|---------------------|---------------|-------------------|--------------------|-----------------|---|---------------------------------------|-------------------------------------|---|
| Y | Tree3 | Tree3 | Decision Tree (3) | Churn | | 0.49664 | 0.24999 | 0.49664 | 0.000 |
| | Tree4 | Tree4 | Decision Tree (4) | Churn | | 0.49664 | 0.24999 | 0.49664 | 0.000 |
| | Tree | Tree | Decision Tree1 | Churn | | 0.53020 | 0.25529 | 0.53020 | 0.065 |
| | Tree2 | Tree2 | Decision Tree (2) | Churn | | 0.53020 | 0.25529 | 0.53020 | 0.065 |

