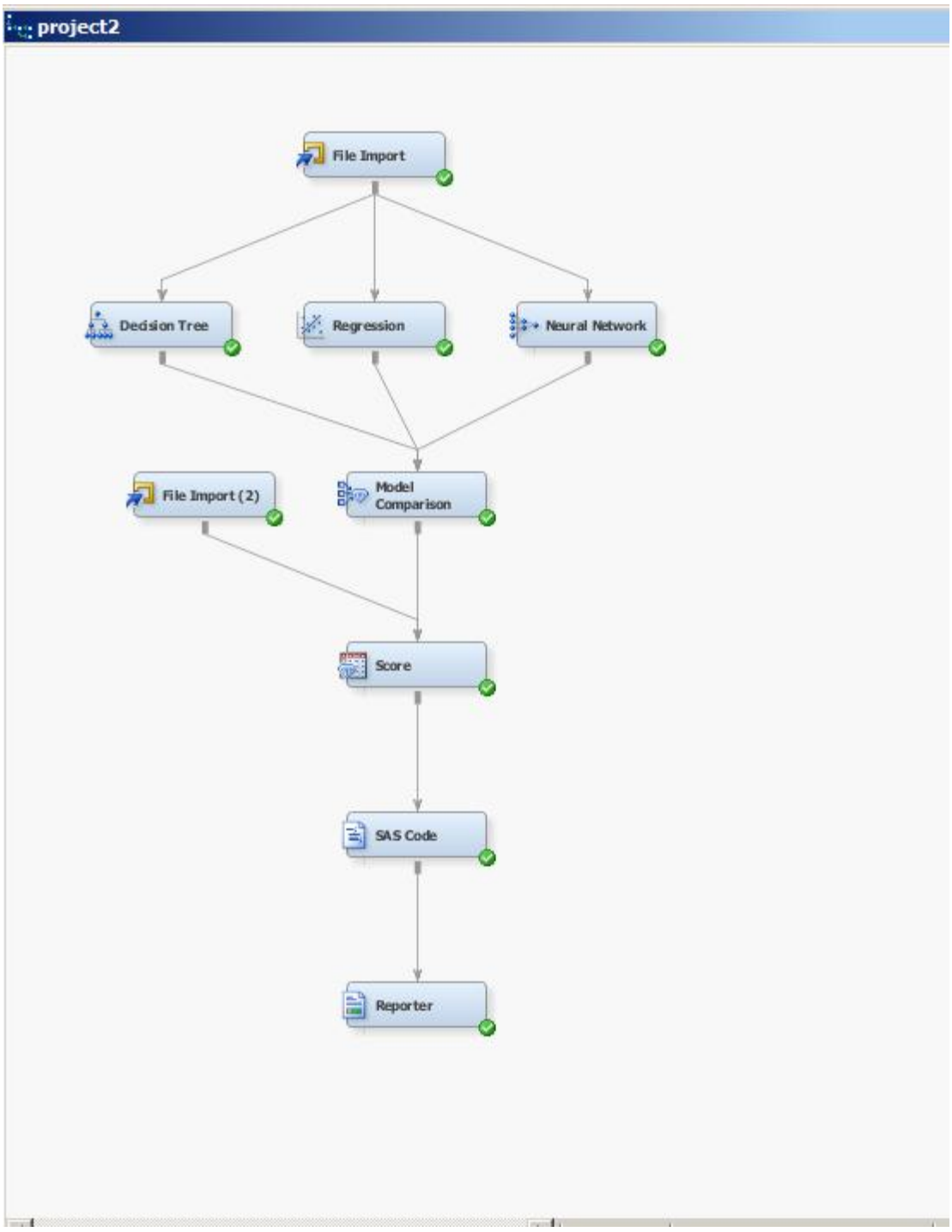
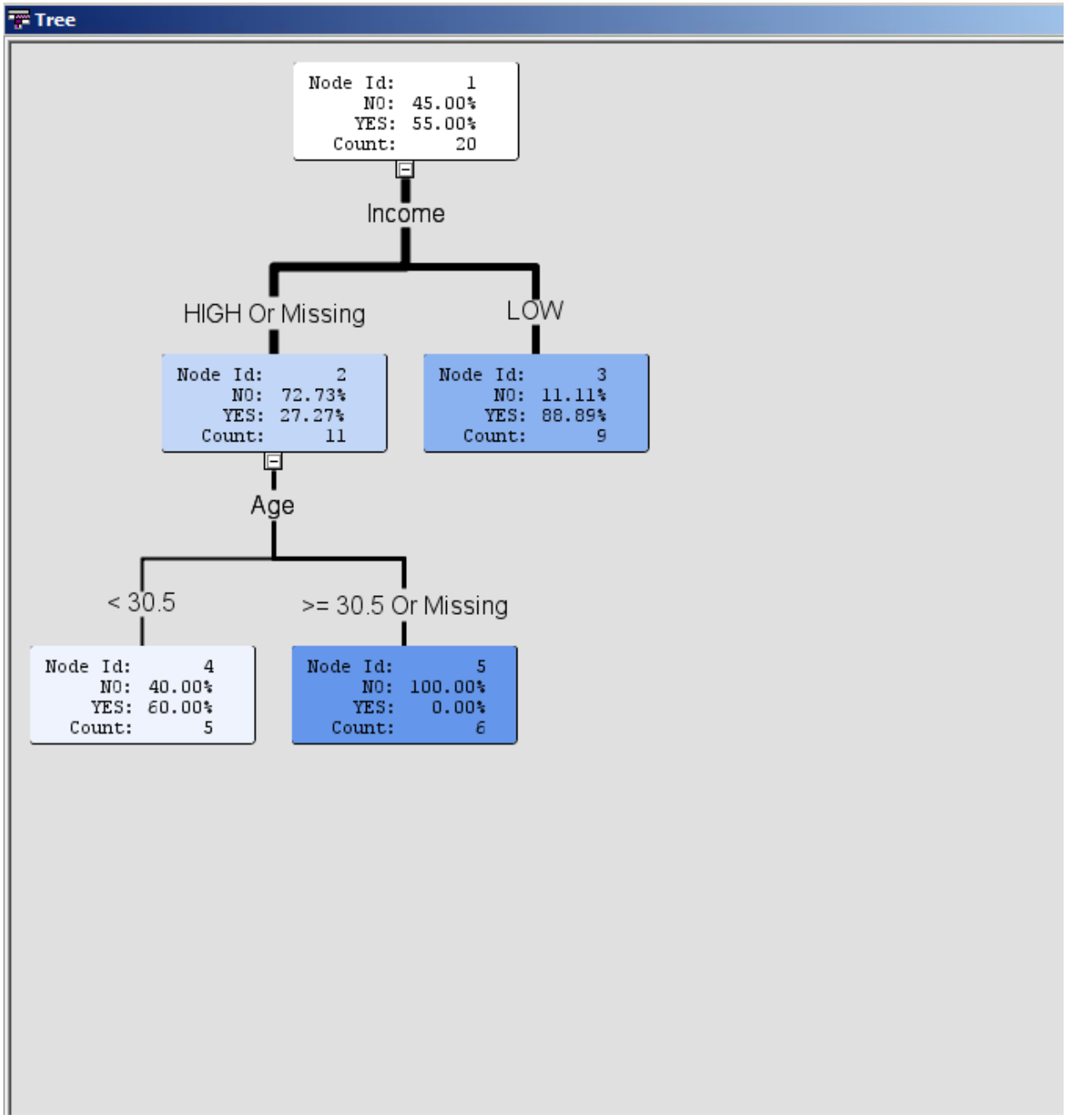
Alaa Hawsawi

In the result, each model gave me different results because they use different way to calculate. I found the decision tree model is the easier way to understand by just looking to diagram you will have a full understanding. The importance of variables shows that only income and age were the best way to spilt because they have numbers. The chart shows that regression and neural models have the same variables but not the decision tree. There was 6 out of 9 cases were for Non-widget buyers and most of them with high income.

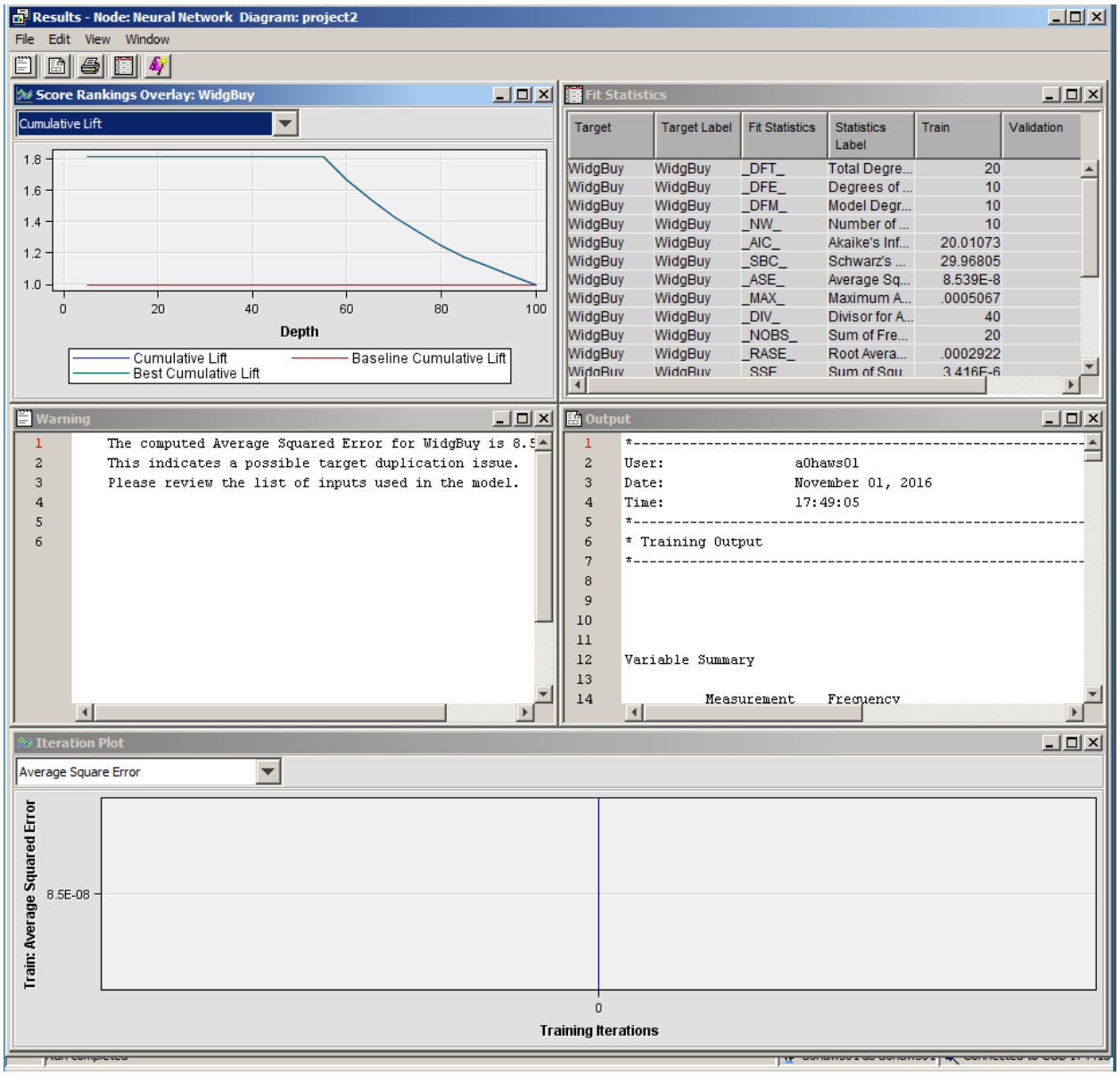
a.


project2
File Import
Decision Tree
Regression
Neural Network
File Import (2)
Model Comparison
Score
SAS Code
Reporter

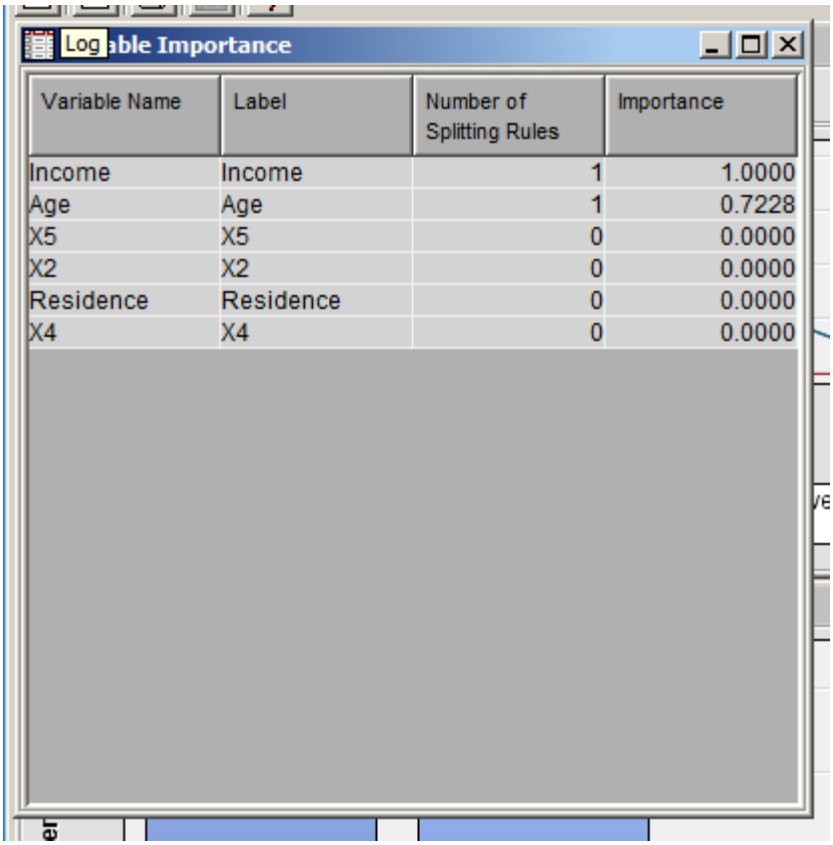
b


Tree
Node Id: 1
NO: 45.00%
YES: 55.00%
Count: 20
Income
HIGH Or Missing
LOW
Node Id: 2
NO: 72.73%
YES: 27.27%
Count: 11
Node Id: 3
NO: 11.11%
YES: 88.89%
Count: 9
Age
< 30.5
>= 30.5 Or Missing
Node Id: 4
NO: 40.00%
YES: 60.00%
Count: 5
Node Id: 5
NO: 100.00%
YES: 0.00%
Count: 6

C

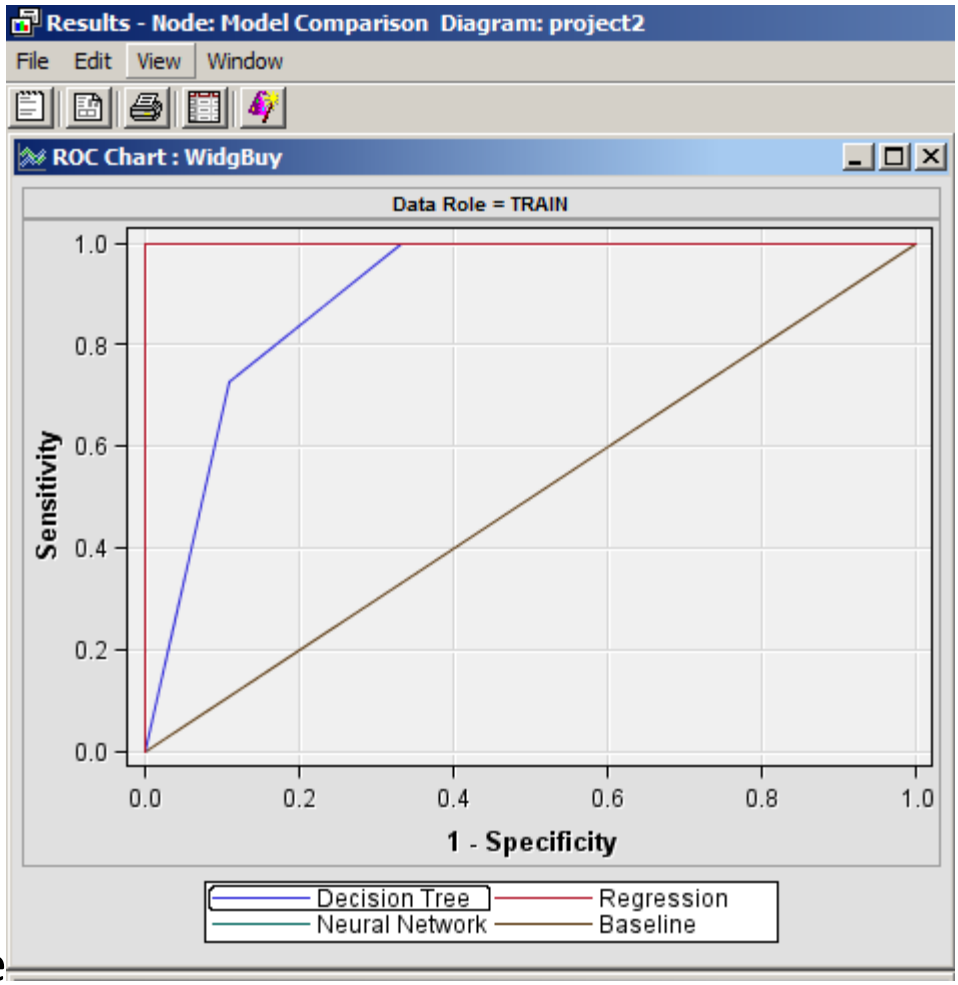

Results - Node: Neural Network Diagram: project2
File Edit View Window
Score Rankings Overlay: WidgBuy
Cumulative Lift
1.8
1.6
1.4
1.2
1.0
0
20
40
60
80
100
Depth
Cumulative Lift
Baseline Cumulative Lift
Best Cumulative Lift
Fit Statistics
Target | Target Label | Fit Statistics | Statistics Label | Train | Validation
WidgBuy | WidgBuy | _DFT_ | Total Degre... | 20
WidgBuy | WidgBuy | _DFE_ | Degrees of ... | 10
WidgBuy | WidgBuy | _DFM_ | Model Degr... | 10
WidgBuy | WidgBuy | _NW_ | Number of ... | 10
WidgBuy | WidgBuy | _AIC_ | Akaike's Inf... | 20.01073
WidgBuy | WidgBuy | _SBC_ | Schwarz's ... | 29.96805
WidgBuy | WidgBuy | _ASE_ | Average Sq... | 8.539E-8
WidgBuy | WidgBuy | _MAX_ | Maximum A... | .0005067
WidgBuy | WidgBuy | _DIV_ | Divisor for A... | 40
WidgBuy | WidgBuy | _NOBS_ | Sum of Fre... | 20
WidgBuy | WidgBuy | _RASE_ | Root Avera... | .0002922
WidgBuy | WidgBuy | _SSE_ | Sum of Squ... | 3.416E-6
Warning
1 The computed Average Squared Error for WidgBuy is 8.5
2 This indicates a possible target duplication issue.
3 Please review the list of inputs used in the model.
Output
1 *----------
2 User: a0haws01
3 Date: November 01, 2016
4 Time: 17:49:05
5 *----------
6 * Training Output
7 *----------
8
9
10
11 Variable Summary
12
13 Measurement Frequency
14
Iteration Plot
Average Square Error
Train: Average Squared Error
8.5E-08
0
Training Iterations

d



Variable Name	Label	Number of Splitting Rules	Importance
Income	Income	1	1.0000
Age	Age	1	0.7228
X5	X5	0	0.0000
X2	X2	0	0.0000
Residence	Residence	0	0.0000
X4	X4	0	0.0000

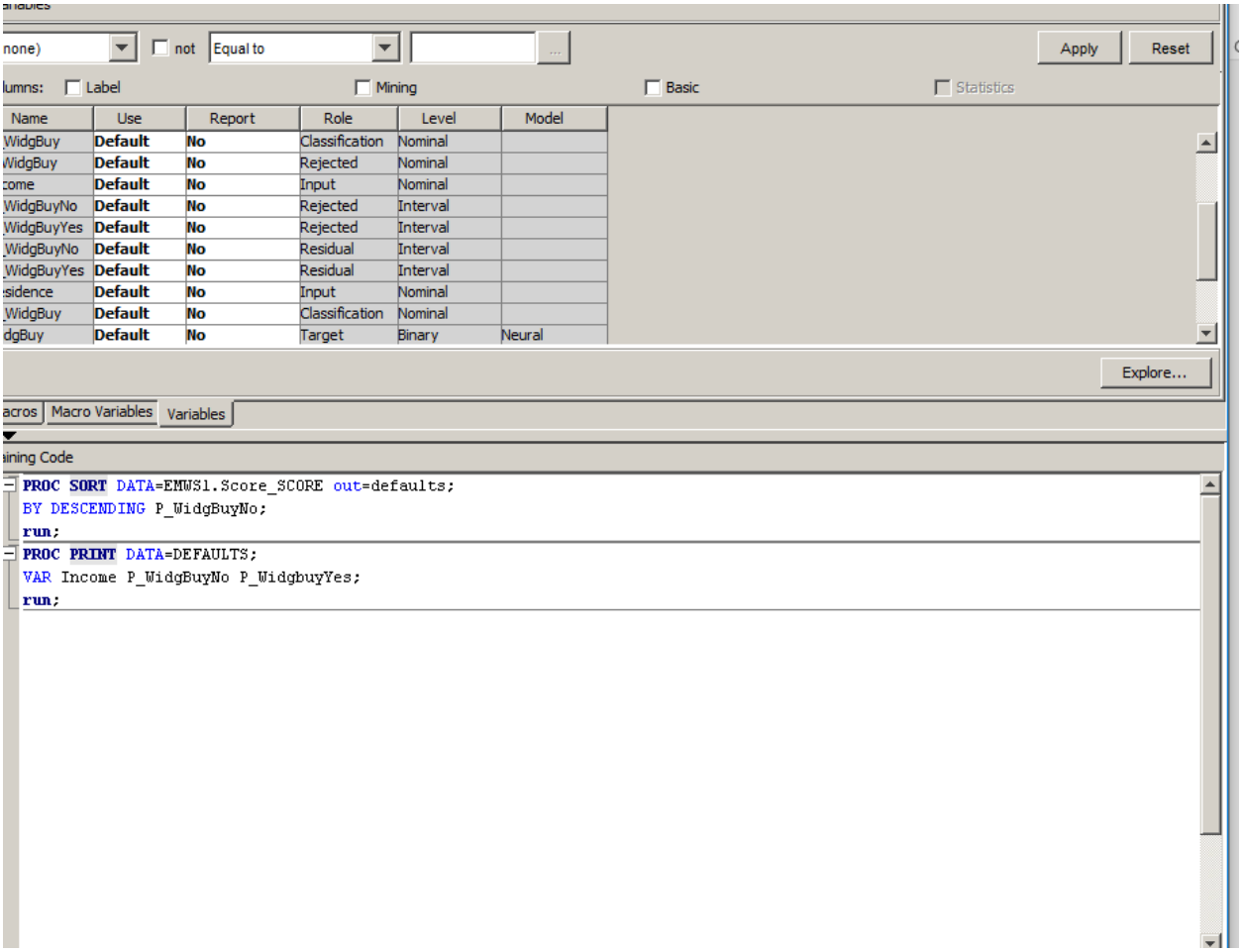
e


Results - Node: Model Comparison Diagram: project2
File
Edit
View
Window
ROC Chart : WidgBuy
Data Role = TRAIN
Sensitivity
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
1 - Specificity
Decision Tree
Regression
Neural Network
Baseline

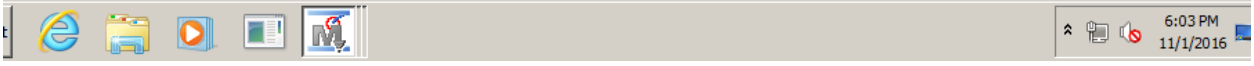
f

Node F Print

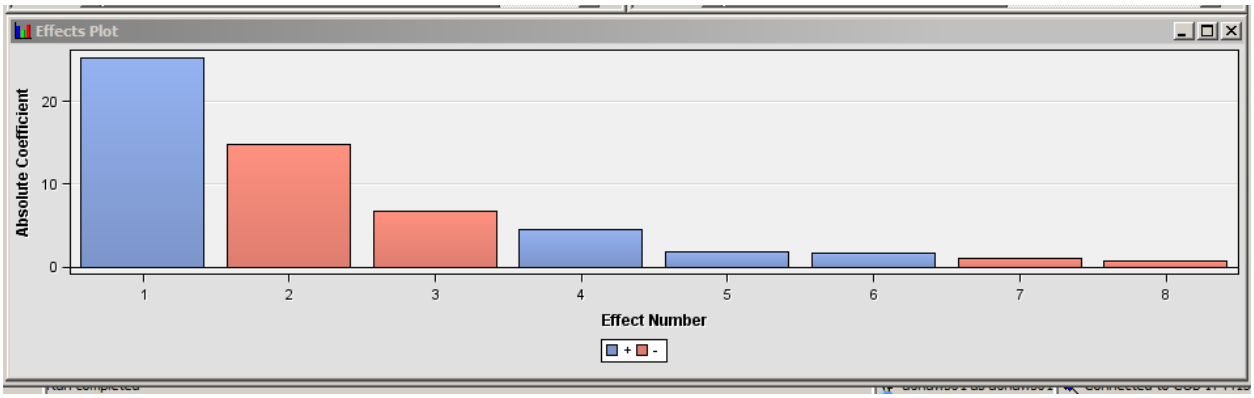
```
*------------------------------------------------------------*
 Node = 3
*------------------------------------------------------------*
if Income IS ONE OF: LOW
then
 Tree Node Identifier   = 3
 Number of Observations = 9
 Predicted: WidgBuy=Yes = 0.89
 Predicted: WidgBuy=No = 0.11

*------------------------------------------------------------*
 Node = 4
*------------------------------------------------------------*
if Income IS ONE OF: HIGH or MISSING
AND Age < 30.5
then
 Tree Node Identifier   = 4
 Number of Observations = 5
 Predicted: WidgBuy=Yes = 0.60
 Predicted: WidgBuy=No = 0.40

*------------------------------------------------------------*
 Node = 5
*------------------------------------------------------------*
if Income IS ONE OF: HIGH or MISSING
AND Age >= 30.5 or MISSING
then
 Tree Node Identifier   = 5
 Number of Observations = 6
 Predicted: WidgBuy=Yes = 0.00
 Predicted: WidgBuy=No = 1.00
```


none)
not
Equal to
Apply
Reset
lumns:
Label
Mining
Basic
Statistics
Name
Use
Report
Role
Level
Model
WidgBuy Default No Classification Nominal
WidgBuy Default No Rejected Nominal
come Default No Input Nominal
WidgBuyNo Default No Rejected Interval
WidgBuyYes Default No Rejected Interval
WidgBuyNo Default No Residual Interval
WidgBuyYes Default No Residual Interval
sidence Default No Input Nominal
WidgBuy Default No Classification Nominal
dgBuy Default No Target Binary Neural
Explore...
acros
Macro Variables
Variables
ining Code
PROC SORT DATA=EMWS1.Score_SCORE out=defaults;
BY DESCENDING P_WidgBuyNo;
run;
PROC PRINT DATA=DEFAULTS;
VAR Income P_WidgBuyNo P_WidgbuyYes;
run;

```
User:                  a0haws01
Date:                  November 01, 2016
Time:                  18:02:31
*------------------------------------------------------------*
* Training Output
*------------------------------------------------------------*



Variable Summary

                     Measurement    Frequency
Role                    Level         Count

ASSESS               BINARY            1
ASSESS               NOMINAL           1
CLASSIFICATION       NOMINAL           3
INPUT                INTERVAL          4
INPUT                NOMINAL           2
PREDICT              INTERVAL          2
REJECTED             INTERVAL          2
REJECTED             NOMINAL           1
RESIDUAL             INTERVAL          2
SEGMENT              NOMINAL           2
TARGET               BINARY            1




                    P_Widg     P_Widg
Obs    Income       BuyNo      BuyYes

 1      high      0.99967    0.00033
 2      high      0.99967    0.00033
 3      high      0.99966    0.00034
 4      low       0.99965    0.00035
 5      high      0.99964    0.00036
 6      high      0.99956    0.00044
 7      low       0.00020    0.99980
 8      low       0.00015    0.99985
 9      low       0.00015    0.99985


*------------------------------------------------------------*
* Score Output
*------------------------------------------------------------*
```



g.


Effects Plot
Absolute Coefficient
20
10
0
1
2
3
4
5
6
7
8
Effect Number
+
-