SAS VIYA Exercise 11

Decision Trees

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**Sources**

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Enterprise Systems, Sam M. Walton College of Business, University of Arkansas, Fayetteville

SAS® Visual Analytics. Release 8.5

SAS® Viya® release V.03.05

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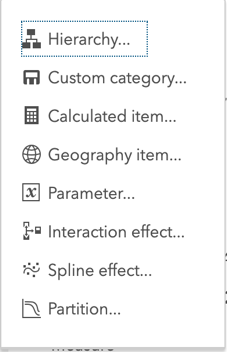
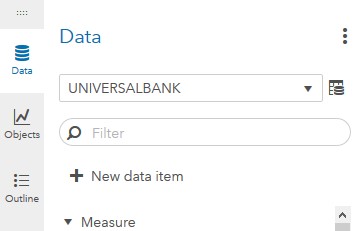
# Use Case – Decision Tree

Universal Bank is a banking dataset with the goal of identifying if a customer accepted a personal loan from a marketing campaign.

## Step 0: Import Data

Following the guide of importing data and import your chosen dataset. See **Viya 02a – Importing data** for specific steps. In this tutorial the dataset used is UNIVERSALBANK.sashdat.

## Step 1: Create Partition

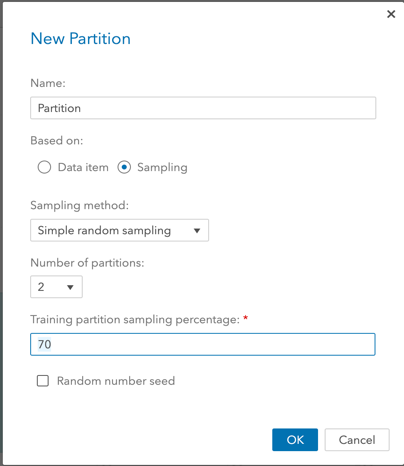


Refer to **Viya 07 – Create Partitions** or follow the steps below to create a partition.

1. Go the **Data** tab on the left-hand pane and
2. Click on **+ New Data Item**

At the bottom of the drop-down menu that will appear,

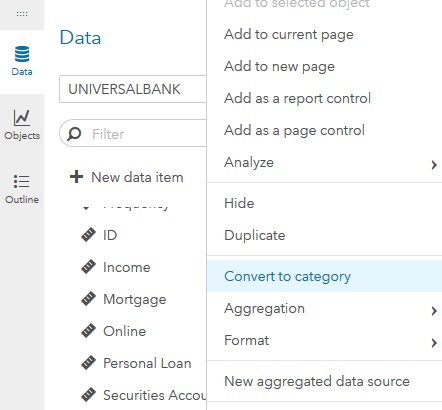
1. Select **Partition**...



A new window will open where you can give the partition a name and designate how many partitions you wish to have. In our use case, we will have 2, one for the training and one for validation. Also, we want to set our training data to account for 70% of the data:

1. Select 2 as **Number of partitions**
2. Write 70 under **Training partition sampling percentage**
3. Click **Ok**

## Step 2: Category Conversion

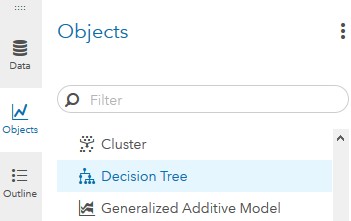
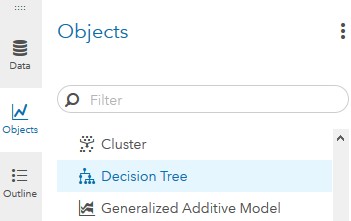


1. Click on **Data**
2. Right-click on **Personal Loan**
3. Click on **Convert to category**

Perform the same right-click and left-click actions to similarly convert the following measures into categories: **CD Account**, **CreditCard**, **Education**, **Family**, **Online**, and **Securities Account**.

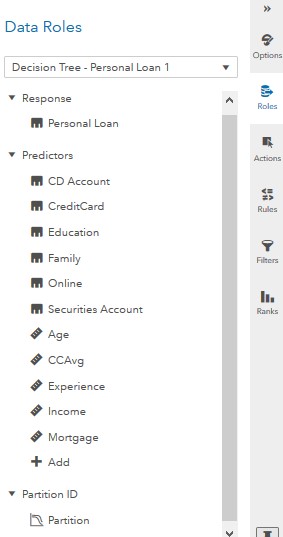
## Step 3: Decision Tree Object

OR



1. On the left-pane, click **Objects**
2. There are two options to find **Decision Tree** 
   1. Scroll down to find it OR
   2. Type ‘Decision Tree' on the search bar on the top
3. Drag and drop it to the working space in the middle-pane

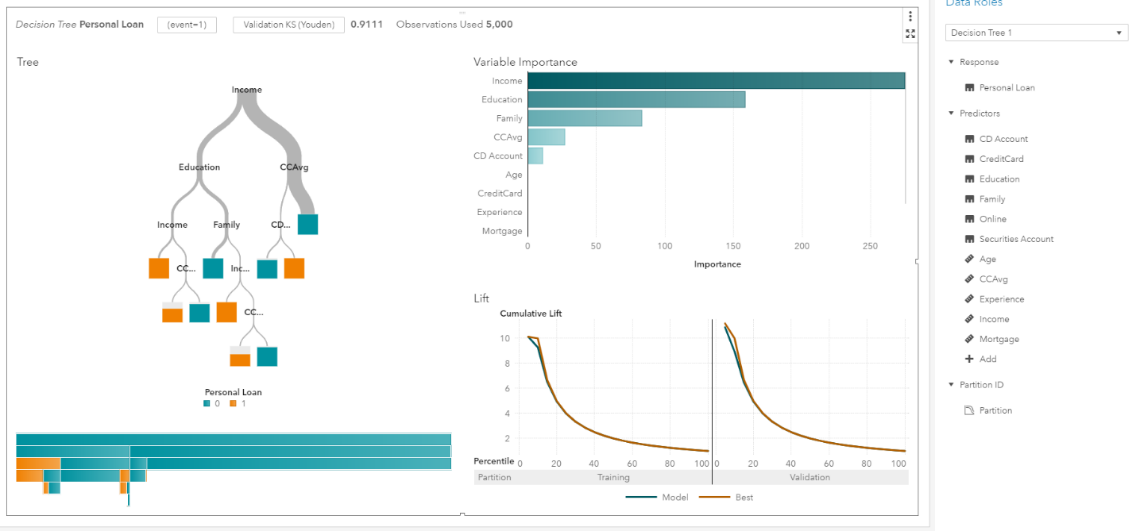
## Step 4: Variables



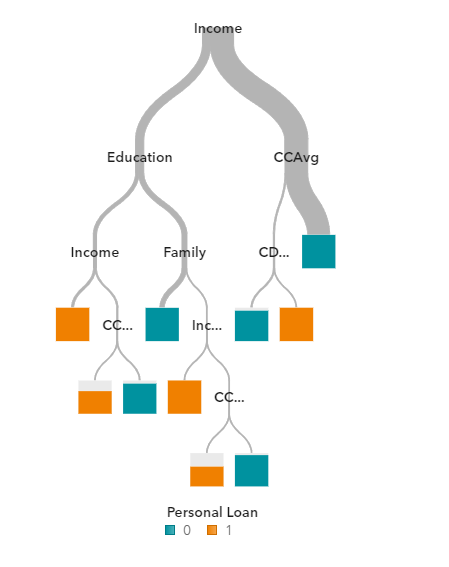
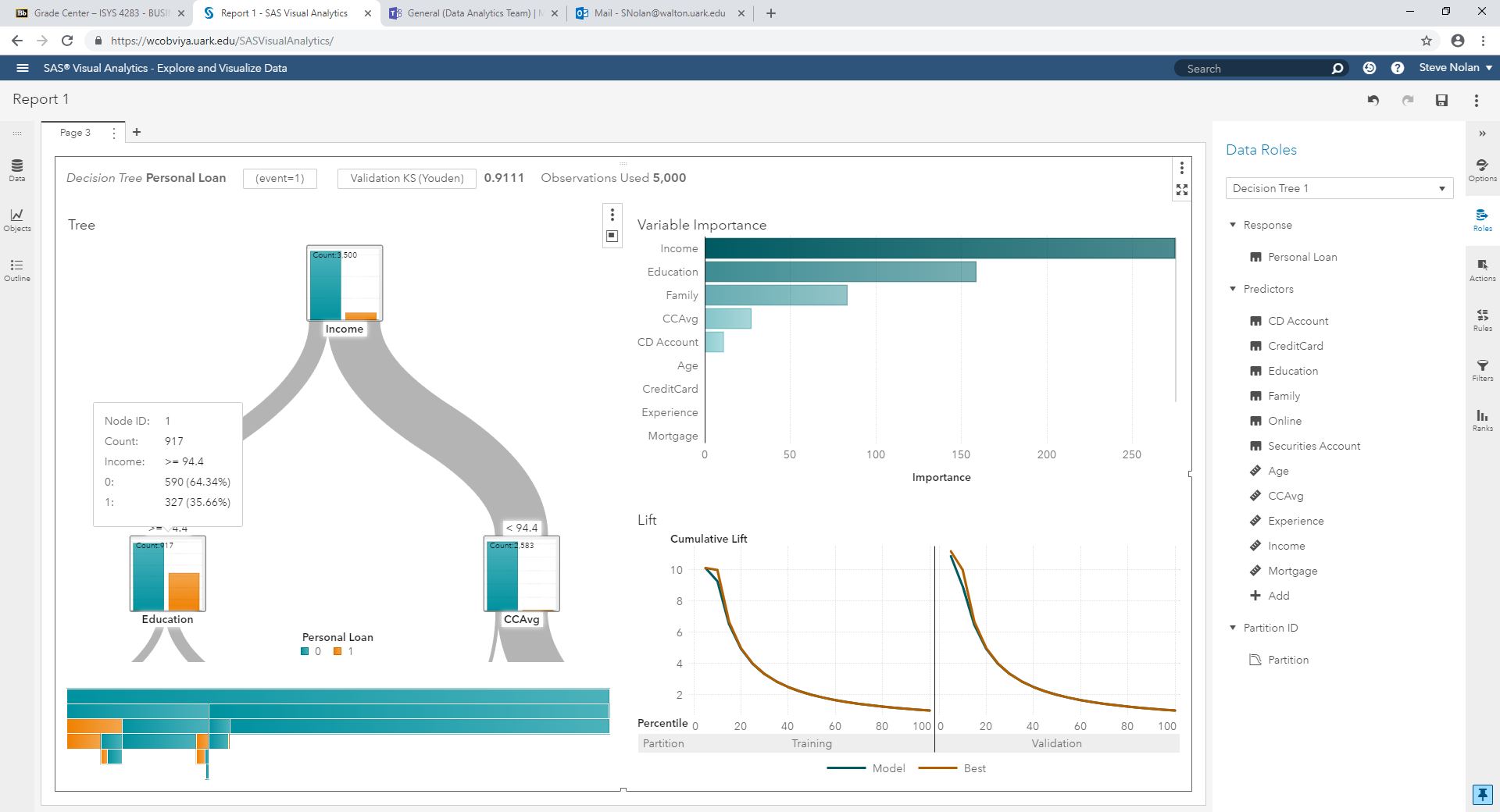
Once you have the decision tree in the workspace, you can designate a response variable (dependent variable) and predictor variables (independent variables). You can also add a partition ID if you have one available.

1. On the right-pane, click on **Roles** (make sure you have clicked on the working space before doing this)
2. Click on **+ Add** under **Response**
3. Add **Personal Loan** (dependent variable)
4. Click on **+ Add** under **Predictors**
5. Add **CD Account, CreditCard, Education, Family, Online, Securities Account, Age, CCAvg, Experience, Income, Mortgage** (independent variables)
6. Click on **+ Add** under **Partition ID**
7. Add the partition you created in **Step 1**

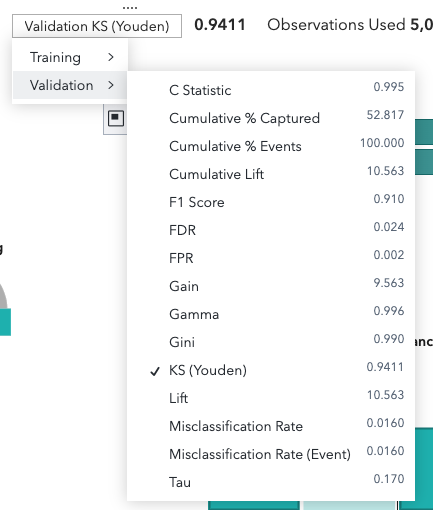
## Step 5: Options

Once you have selected your data, the decision tree will update and display various pieces of information.

Your tree displays the variable importance as well as the various splitting rules.

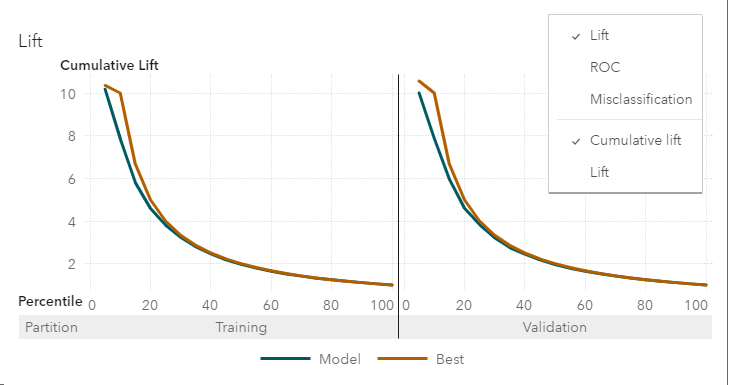
You also have the option to change the desired event as well as the primary evaluation metric.

In this example, we would like to see the misclassification rate.



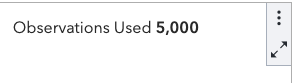
1. Click on **Validation KS (Youden)**
2. Click on **Validation**
3. **Click on Misclassification Rate**

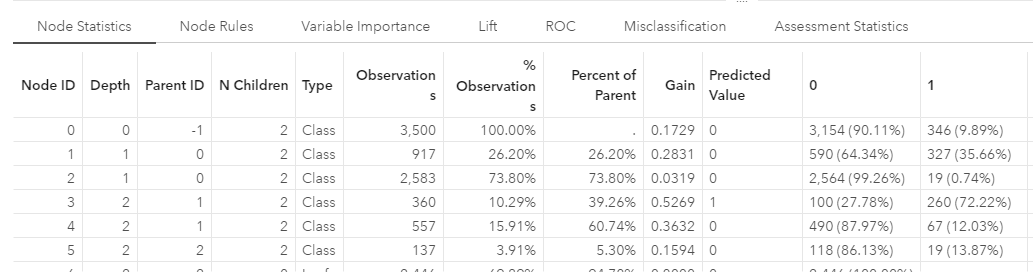
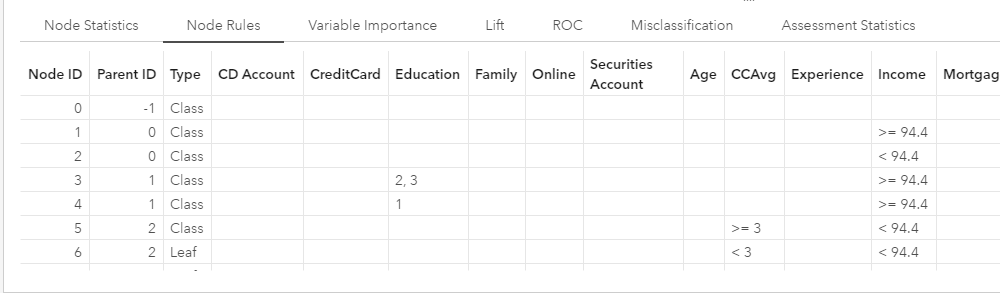
You can change the lift chart into the ROC curve by hovering over the graph and,



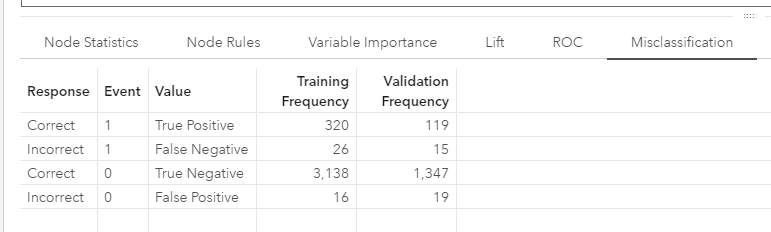
1. Selecting the three vertical dots in the upper right-hand corner
2. Click the **ROC** option

## Step 6: Details



1. Click on the maximize button in the upper-right corner of your decision tree to get additional details about your decision tree, for example:
2. Click on **Node Statistics**
3. Click on **Node Rules**
4. Click on **Misclassification**

The misclassification tab shows the confusion matrix for your data



From here, you can adjust various options about your decision tree in the options panel on the right side.

Congratulations, you have created a decision tree in VIYA!