



Demo Neural Net Essentials

Dr. Goutam Chakraborty



Demo of Neural Network

Add Neural Network node (Model) tab and connect to the Impute node. Make following changes in the Neural Net node

- Select **Optimization** \Rightarrow ellipsis button
- Select **Enable** \Rightarrow **No** under the Preliminary Training options
- Run and examine results
 - Fit statistics
 - Output window
- Reopen the Optimization window and examine the Optimization options in the Properties panel for the Neural Network node.
 - Enter **100** for the Maximum Iterations property.
 - Run the Neural Network node and examine the results.
- Examine fit statistics and iteration plot
- Rename Neural Network (All Vars)



Performance of Neural Network

- All Variables (No selection):
 - Number of Parameters = 253, ASE (V) = 0.2429, Misclassification (V) = 0.4301



Demo of Neural Network (Continued)

- Copy the existing Neural Network Node, Paste it on the diagram and add it to the Regression (Optimal) node.
- Right-click the **Neural Network** node and select **Update** from the pop-up menu.
- Open the Variables dialog box for the Neural Network node and check which variables are now being input the Neural Network. Rename the node as Neural Network (Var Selection)
- Run the node and explore results



Performance of Neural Network

- All Variables (No selection):

- Number of Parameters = 253, ASE (V) = 0.2429, Misclassification (V) = 0.4301

- With variable Selection:

- Number of Parameters = 19, ASE (V) = **0.2404**, Misclassification (V) = **0.4216**



Demo of Neural Network (Continued)

- Copy the Neural Network (Var Selection), Paste it on the diagram and add it to the Regression (Optimal) node.
- Click on network ellipsis button and change number of neurons to 6
- Rename this node as Neural Network (6 Neurons, Var Selection)
- Run the node and explore results



Performance of Neural Network

- All Variables (No selection):
 - Number of Parameters = 253, ASE (V) = 0.2429, Misclassification (V) = 0.4301
- With variable Selection:
 - Number of Parameters = 19, ASE (V) = 0.2404, Misclassification (V) = 0.4216
- With variable Selection and 6 neurons:
 - Number of Parameters = 37, ASE (V) = **0.2398**, Misclassification (V) = 0.4228



Demo of Neural Network (Continued)

- Click the **Model** tab. Drag the **AutoNeural** tool into the diagram workspace.
- Connect the **Regression(Optimal)** node to the **AutoNeural** node
- Confirm that this setting is in effect: **Train Action** \Rightarrow **Search**. This configures the AutoNeural node to sequentially increase the network complexity.
 - Select **Number of Hidden Units** \Rightarrow **1**. With this option, each iteration adds one hidden unit.
 - Select **Tolerance** \Rightarrow **Low**. This prevents preliminary training from occurring.
 - Select **Direct** \Rightarrow **No**. This deactivates direct connections between the inputs and the target.
 - Select **Normal** \Rightarrow **No**. This deactivates the normal distribution activation function.
 - Select **Sine** \Rightarrow **No**. This deactivates the sine activation function
- Run the AutoNeural node and explore results



Performance of Neural Network

- All Variables (No selection):
 - Number of Parameters = 253, ASE (V) = 0.2429, Misclassification (V) = 0.4301
- With variable Selection:
 - Number of Parameters = **19**, ASE (V) = 0.2404, Misclassification (V) = 0.4216
- With variable Selection and 6 neurons:
 - Number of Parameters = 37, ASE (V) = **0.2398**, Misclassification (V) = 0.4228
- AutoNeural:
 - Number of Parameters = **7**, ASE (V) = 0.2411, Misclassification (V) = 0.4175