

# Introduction: NeuralTools

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# Neural Networks

- » Prediction
- » Category Recognition
- » Pattern Recognition
- » Mimicking Neurons
  - “thinking”

# Predictive Modeling

- » A statistical model of future behavior
- » Made up of predictor variables that are likely to influence results
- » Historical data is analyzed to find relationships between predictor variables and the outcome (or outcomes)
- » Outputs and predictors can be numerical or categorical/classification in nature

# Numerical Modeling

- » The output of interest has a numerical value
- » Conventional approach using Linear Regression (simple or multiple)
- » Multiple numerical outputs require Multivariate Regression techniques
- » Predictors can be numerical or categorical
- » Examples:
  - Investment prediction
  - Air and sea currents

# Categorical Modeling

- » The model requires observations to be placed in groups
- » Logistic Regression for binary models (two categories)
- » Places observations into either group based on exceeding a critical value or not
- » Discriminant analysis for more than two categories
- » Places observations into groups based on their statistical distance from each group
- » Predictors can be numerical or categorical
- » Examples:
  - Tumor diagnosis
  - Credit scoring

# Neural Nets vs. Statistical Methods

- » Neural nets: an alternative to traditional statistical methods
- » Used for function approximation and classification, just as Linear Regression, and Discriminant Analysis and Logistic Regression are
- » An advantage of neural nets is that they are capable of modeling extremely complex functions, in contrast with the traditional linear techniques
- » Neural nets are not subject to the same assumptions as statistical methods (autocorrelation, Gaussian errors, equality of variance etc)

# Ribbon



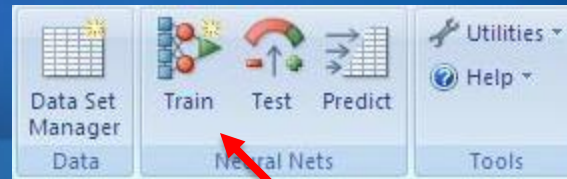
# Data Set Manager

The screenshot shows the 'Data Set Manager' dialog box in a software application. The dialog is titled 'NeuralTools - Data Set Manager [02.loan.application.xls]'. It features a 'New' button, a 'Delete' button, and a 'Data Set' section. The 'Data Set' section has a 'Name' field containing 'Loan Data' and an 'Excel Range' field containing 'A1:G502'. There is a 'Multiple...' button next to the Excel Range field and a checked 'Apply Cell Formatting' checkbox. Below this is a 'Variables' table with the following data:

Excel Data Range	Variable Name	Variable Type
A2:A502	Status	Unused
B2:B502	Age	Independent Numeric
C2:C502	State	Independent Category
D2:D502	Housing	Independent Category
E2:E502	Salary	Independent Numeric
F2:F502	Loan Amount	Independent Numeric
G2:G502	Outcome	Dependent Category

At the bottom of the dialog, it says '7 Variables, 501 Data Cells Per Variable' and has an 'Import...' button. The 'OK' and 'Cancel' buttons are at the bottom right. A red arrow points to the 'Data' button in the application's toolbar.

# Training



**NeuralTools - Training**

Train | Net Configuration | Runtime

Data Set: Loan Data

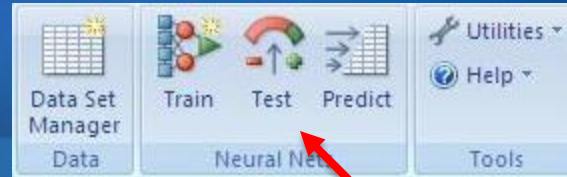
Save Net As: "Net Trained on Loan Data" (To: Active Work) Browse...

When Training is Completed

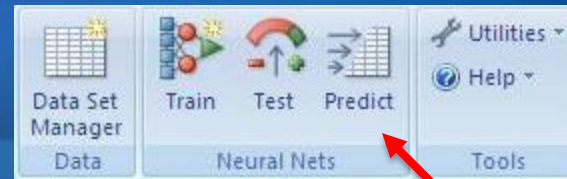
- Automatically Test on Random: 20 % of Cases
- Automatically Predict Missing Dependent Values
  - Enable Live Prediction
  - Place Predicted Values Directly in Data Set
- Calculate Variable Impacts

Next >> Cancel

# Testing



# Predicting



**NeuralTools - Prediction**

Data Set: Loan Data

Net to Use:

Variable Matching:

Predict for:

- Cases with Missing Dependent Values
- All Cases
- Cases with "predict" Tag

Options:

- Place Predicted Values Directly in Data Set
- Enable Live Prediction
- Exclude Live Prediction for Cases with Missing or Invalid Values

# NeuralTools

## » Training

- Identifies data set with known outcomes

## » Testing

- Uses data patterns
- Assesses relationships

## » Predicting

- Determine outcomes with new data
- Live Update

# NeuralTools Results

- » Placed directly in data set
  - Category
  - Numeric
- » Dynamic linking to data
  - Updates predictions when new data are added

# Neural Nets

- » MLF – Multi Layer Feedforward
  - Faster predictions
  - Better suited to outlier data
- » GRN – Generalized Regression Net
  - Numeric prediction
  - Faster training phase
- » PNN – Probabilistic Neural Net
  - Category prediction

# Sources of help

- » On-line tutorials
- » Help menu within the software
- » Software manuals (PDF)
- » Palisade web-site [www.palisade.com](http://www.palisade.com)
- » Helpdesk: <http://helpdesk.palisade.com/>
- » Forum: <http://forums.palisade.com/>
- » Your Palisade Sales Representatives
- » Palisade Technical Support: [tech-support@palisade.com](mailto:tech-support@palisade.com)



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