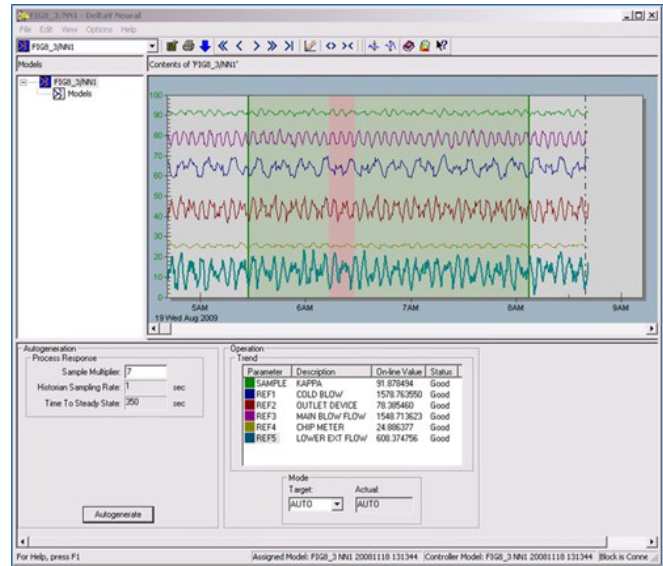# DeltaV™ Neural

- Easily creates virtual sensors using neural networks

- Neural net executes right in the DeltaV™ controller as a function block

- Automated pre-processing, design, training and verification

- Expert mode allows interaction in the neural network development

DeltaV™ Neural provides easy-to-use tools for developing and training the neural network model.

Introduction

DeltaV™ Neural gives you a practical way to create virtual sensors for measurements previously available only through the use of lab analysis or online analyzers. DeltaV Neural is easy to understand and use, allowing process engineers to produce extremely accurate results even without prior knowledge of neural network theory.
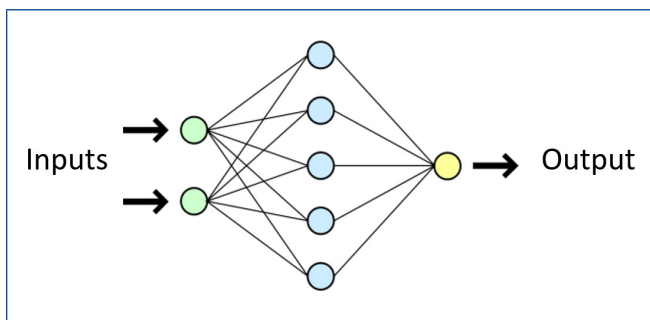
Neural network for inferential property calculations.

Benefits

Improves product quality by reducing variability. Continuous "virtual" measurement of qualitative and analytical parameters allows for much tighter control of many process parameters. This provides automatic compensation for unmeasured disturbances and process changes. DeltaV Neural enables "if-then" analysis of a process change based on future prediction of critical parameters.

Increases process availability. Provides a backup and crosscheck on a measurement provided by a sampled or continuous analyzer like mass spectrometers and stack analyzers. Provides continuous measurement for all parameters measured by multi-streaming analyzers.

Saves time using automated network training. Take advantage of incredibly easy-to-understand graphical tools for configuration and training of the network. Drag-and-drop configuration and automatic historical collection make DeltaV Neural accessible to process engineers in need of real-time qualitative analysis.

Runs In the Controller for fast, solid execution. Running the Neural Network right in the DeltaV controller means that if you have redundant controllers, you therefore have redundant Neural Nets at no incremental cost. It executes as fast as once every second. In addition to performance benefits, this methodology allows implementation without the requirement for costly host computers interfaced to the DeltaV system in a supervisory fashion.

Product Description

DeltaV Neural offers you an entirely new approach to the implementation of virtual sensors with neural networks. Using the DeltaV Neural function block you can identify up to 20 individual process measurements to be correlated with lab entry or continuous analyzer data. No step testing or manual disturbance of the process is necessary in order to implement the neural net.

DeltaV Neural is implemented as a function block that executes in your DeltaV controller. This allows you to use the standard tools of DeltaV Control Studio to define the necessary input variables along with manual lab entry data or data from a continuous analyzer. An example configuration is shown in the following illustration:
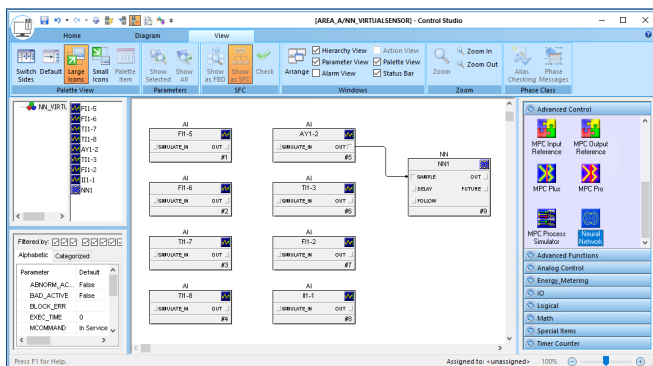

DeltaV Neural implementation with Function Blocks in Control Studio.

The DeltaV Continuous Historian automatically collects data on the inputs used by the Neural Net function block--completely eliminating the need to configure a process historian. Alternatively, you may import existing historical data into DeltaV Neural using commonly available tools such as Microsoft Excel for data preparation.

DeltaV Neural will automatically perform the training needed to build the network and stop when over training is detected. The historical data used to train the model can be easily viewed, and any portions containing abnormal operating conditions may be excluded using easy graphical tools.

Upon completion of the automated network training, the sensitivities of each process input may be viewed graphically. DeltaV Neural is capable of eliminating any variables shown to have little or no effect on the output.
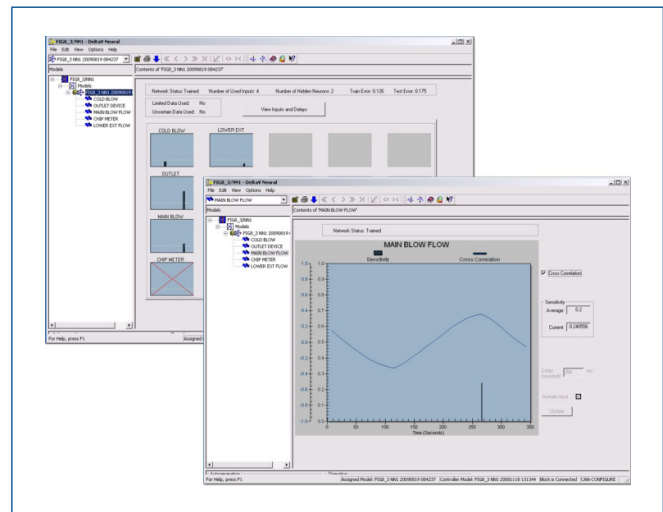
Easily view and edit the sensitivity of each input.

By selecting the "expert" option, you may actually modify the sensitivity of each individual input by modifying the correlation between input and output.

Additionally, experts have the option to specify such detailed parameters as outlier limits, max/min number of hidden neurons, and maximum training epochs. It is not a mandatory requirement for the user to specify any of the preceding values: they are intended for the use of expert users only.

Verification of actual and predicted values vs. samples gives the user an easily understandable picture of how the network behaves. Verification may be done against original data or any other user selectable timeframe.

Licensing

DeltaV Neural is licensed per Neural Net function block. Licenses can be assigned to the ProfessionalPLUS and are consumed when a Neural Net function block is configured in a control module and assigned to a DeltaV controller, Application Station, or ProfessionalPlus.

When a Neural license expires, the Neural function blocks will continue to execute in the controller. A attempt to download to a controller hosting one of the Neural function blocks with an expired license will fail with an error indicating the license has expired. If the controller needs to be re-downloaded, the last known good download can be sent using the "Send Last Known Good Download" command from the controller's context menu.
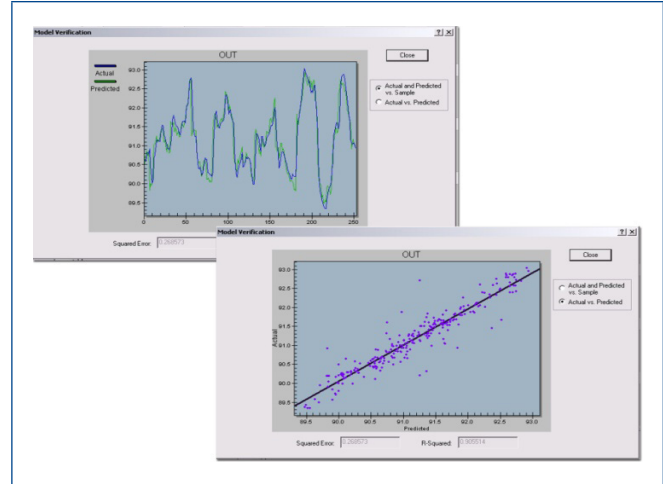
Graphical verification of actual vs. predicted.

Ordering Information

Perpetual License - v14 and Earlier Systems or Systems with Existing Perpetual Licenses

Description	Model Number
DeltaV Neural—Single Neural Net Function Block	VE3153F01

Ordering Information

Subscription License - DeltaV v15.LTS and Later Systems

Description	Model Number
DeltaV Neural x-Year Subscription; 1 Function Block; Annual Price*	VE3153SxF01_YyFYzz*

*Where **x** represents the length of the subscription term in years (1, 3, or 5)

*Where **y** represents the specific year of the subscription term (1, 2, 3, 4, or 5)

*Where **zz** represents a two-digit indicator of the year of purchase (e.g. 23)

Related Products

■ DeltaV Spectral PAT. Using spectral analyzers for real-time complex product measurements, DeltaV's Embedded Spectral Process Analytic Technology (PAT) machine learning algorithms and chemometric modeling techniques can accurately predict product quality for use as on-line quality soft sensors.

Prerequisites

■ A DeltaV Professional or ProfessionalPLUS Station is required to configure DeltaV Neural.

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