



What can we help you discover?

Synapse March 2003

Spring greetings from all of us at NeuralWare. Like many others in the North East United States, we have had quite a winter with much more snow than normal. 50 degree weather has finally arrived, and not a moment too soon. Welcome to the first issue of Synapse for 2003. Synapse is NeuralWare's newsletter with the latest information for friends and customers of NeuralWare. In this issue, we will cover the following:

- The 3.1 Release of NeuralWorks Predict
- The 2003 training schedule including a new, never before offered course
- Tips from our Technical Support Group
- NeuralWare signs technology agreement with China's third largest steel mill
- Submit your own case study and receive credits towards products or services
- First Linux Predict 3.1 SDK ships
- Other miscellaneous tidbits

NeuralWare and Wuhan Iron and Steel Group announce a 10-year Technology License

NeuralWare and WISCO-ICC, the Instrumentation and Control Company of Wuhan Iron and Steel (Group) Company announce the signing of a 10-year comprehensive Technology License Agreement that will permit WISCO-ICC to use NeuralWare's advanced neural network technology to develop analytic software applications for internal use and for resale in the People's Republic of China. The Agreement makes WISCO-ICC NeuralWare's first strategic partner in the burgeoning China marketplace, and it marks the first intellectual property license to be acquired by WISCO-ICC following China's accession to the WTO. In addition to providing access to existing core neural network technology, NeuralWare will provide training and support for WISCO-ICC engineers, and access to new analytic technologies developed by NeuralWare during the term of the license.

In announcing the technology license, Jack Copper, CEO of NeuralWare noted that "My initial contact with WISCO-ICC resulted from NeuralWare's participation in a trade delegation to Wuhan China sponsored by the Urban Redevelopment Authority of Pittsburgh. URA support, and the long-standing sister city relationship between Wuhan China and Pittsburgh, added considerable credibility to NeuralWare's efforts to enter the Chinese market. The effort that went into negotiating this Agreement clearly demonstrates that Chinese enterprises are becoming increasingly sophisticated in their selection of tools and technologies to generate higher returns on investment in manufacturing operations and improved product quality. Given WISCO-ICC's reputation as a technology leader in China, we believe our partnership with WISCO-ICC and its parent, the Wuhan Iron and Steel (Group) Corporation is a solid foundation for developing a wide variety of intelligent applications for WISCO-ICC to offer throughout China."



What can we help you discover?

Also, Mr. Wang Weiping, Senior Engineer and General Manager of WISCO-ICC stated that "WISCO-ICC is very pleased to be the first licensee of NeuralWare technology in China. WISCO-ICC conducted a thorough evaluation of NeuralWare's products and technology, and we believe that the combination of WISCO-ICC experience in steel production and related fields, and NeuralWare's experience in applying advanced analytic technologies will yield application software that will give our parent WISCO and our external customers strong competitive advantages through significantly improved operational capabilities and more accurate analysis and forecasting methodologies."

Training

NeuralWare is pleased to announce the release of our new training course, Developing Neural Network Applications. This three-day neural computing course focuses on the practical aspects of creating and deploying neural network applications using NeuralWare development tools. It provides an overview of the NeuralWare product line, and describes the software architecture of each application and library. It also identifies the functional and architecture relationship among the products. Next, the course presents an overview of the methods that can be used to deploy neural network models, including standard NeuralWare .nnd and .npr files, FlashCode™, Designer Pack, and use of NeuralWare library components. Additional information and a syllabus are available on our website at www.neuralware.com/training.jsp.

Register by March 31 for a NeuralWare course from the April - August series and receive a 10% early-bird discount. Courses are taught in Pittsburgh at our conveniently located headquarters just a few miles from downtown Pittsburgh.

Our regularly scheduled training courses ensure that our customers are knowledgeable about neural network technology and using our software effectively. See the schedule below to select the course that best fits your schedule. Make sure to visit our website www.neuralware.com/training.jsp or talk with our sales department to get complete course information before making your final selection.

Class size is limited to offer participants personalized instruction when necessary. A well-organized yet informal structure allows flexibility and provides opportunities for real-world information sharing and problem solving. When you visit the training website, look for comments from previous attendees.

If you have several individuals within your company that would like to attend our course, let us know and we will be happy to provide information on our on-site training programs. Contact us via email at training@neuralware.com.

If you would like to expand your knowledge of neural network technology using NeuralWare's state-of-the-art tools, plan to attend a course soon. Don't forget the 10% early-bird discount. Contact us today!

Current training schedule

[Advanced Neural Computing](#) (3.5 days)

April 28 – May 1



What can we help you discover?

[Developing Neural Network Applications](#) (3 days)

May 12-14

[Applying Neural Networks to Business, Industry and Government](#) (4.5 days)

June 2-6

Aug 11-15

Submitting an Article

If you wish to submit a case study, application note, or technical tip for publication, please contact NeuralWare sales. If we publish your contribution, you will receive a one-year Technical Assistance Program (TAP) subscription for the NeuralWare program that you use - a minimum \$375 value. If you prefer, you may also apply the credit towards NeuralWare products for training! We hope you will consider this exciting opportunity.

The Latest NeuralWorks Product Information

NeuralWare is pleased to announce the 3.1 release of NeuralWorks Predict. New to the release are further enhancements to the SOM module which was added with the 3.0 release of Predict. Predict 3.0 represented a major update of NeuralWorks Predict. In addition to a completely revised Graphical User Interface (GUI) for the Excel® version, Predict 3.x contains a full featured implementation of Kohonen Self-Organizing Maps to add more power to Predict's exploratory data analysis facilities.

- Predict 3.x Self-Organizing Map (SOM) models can have up to 4 dimensions, and up to 30000 processing elements in the Kohonen Layer.
- The maximum number of data rows that Predict (in Excel) can use has been increased to 65,536 (the full size of an Excel spreadsheet). Command line files are limited only by available computing resources. Demonstration release limitations increased slightly to 32 fields and 512 records.
- When training ends for a Multi-Layer Perceptron (MLP) model, basic model performance is immediately evaluated and results displayed in a dialog box. MLP models are used for Prediction, Ranking, and Classification models.
- The Predict GUI for Excel has been completely redesigned to take advantage of Visual Basic for Applications forms and controls, including Unicode fonts to support international character sets.
- Model parameters are more logically organized on tabbed property pages as part of a new Model Parameters dialog box and new Preference property pages provide easy access to Predict operational parameters. Default names for input and output fields can now be specified.
- The status display that appears during model building has been revised; elapsed times for major steps are now displayed.
- A number of improvements to the Command Line Interface have been made, including a new Command Line Interface that is more like UNIX and MS-DOS command lines. The original Command Line Interface is also still provided. Refer to the Command Line Interface Reference in Predict Help for more information.



What can we help you discover?

The latest version of Predict is now available for evaluation by going to www.neuralware.com/products.jsp? Once we receive your request, we will email you the link so that you may download and try the latest version. We hope you will give Predict a “test-drive”!

Tips from our Technical Support Group

Faster Performance

Computer processing speeds are amazingly fast, relative to computers of a few years ago. Yet we can now record and store more data than ever before, and we desire to analyze ever-larger processes. The net effect of course is that faster data modeling times are still an important issue in most application domains.

Here are few tricks for NeuralWorks Predict and Professional II/PLUS customers, tricks that can sometimes make a world of difference. Please send a brief email to help@neuralware.com sharing your experiences with these tips.

Predict tip #1: NeuralWare once ran hundreds of models over dozens of data sets in a large experiment, and in doing so we set Predict to using increments of 10 hidden layer nodes in hopes of improving training times. Predict built models having 0, 10, 20 or so hidden layer nodes; its normal network creation adds just a few hidden nodes at a time, sometimes 1 node, sometimes 2 or 3, and the layer continues to grow until training stops based upon measured performance on a test data set. Training times improved as hoped, but an unexpected benefit also appeared. . . models built in this way often generalized better on unseen data! So try this with caution on your data, and let us know how it works! When creating a new model, prior to clicking on the Train button, instead click the More Parameters button. In the Hidden Architecture section, change the Minimum Increment and Maximum Increment entries from 1 and 2 to 10 and 10. Click OK and then train the model. You can expect test results to improve on the Training segment of your data, but you should ensure that the Test data set results and especially results run on unseen data also improve. Contact us if you wish to try this in an older version of Predict.

Predict tip #2: If you use a version of Predict before version 2.40, or any version named NeuralSIM, and you use more than 2,500 data records in our Excel interface, please do contact us. Newer releases of Predict include a very nice speed improvement which, depending upon the amount of data, can be orders of magnitude faster.

ProII/PLUS tip #1: If you train networks with more than 32,000 training records, Professional II/PLUS slows down to handle random presentation of data. You might wish to experiment with sequential record presentation, not because it is better than random presentation, but because it will have an order of magnitude impact on processing speed. It depends upon the network paradigm in use; networks such as Back-Propagation and LVQ uses random data presentation by default, some paradigms do not. Using the I/O menu Parameters dialog, look at the Learn column near the top left edge of the dialog. Change from ‘File Rand’ (random presentation) to ‘File Seq’ (sequential presentation) and okay the



What can we help you discover?

dialog. Training will now proceed much faster. You should make sure that your data records appear in random order within the training file if you wish to use sequential data presentation.

ProII/PLUS tip #2: Graphical feedback is interesting and instructive when manually building neural networks, but the update of each graph's display consumes training time. For faster performance, try training networks without any active graphs. You can delete existing graphs using Graph icon / Delete, or temporarily disable them using Instrument menu / Disable. It typically slows their update frequency which provides a little less feedback, but allows more time spent actually training the network. To reduce a graph's update frequency, first double-click on the graph (or use Graph icon / Edit). In the Instrument Control section along the dialog's left edge, change the default '1' or '10' which is editable under 'Learn'. Increase the value to 100, 300, 500 or whatever you wish, and okay the dialog. Setting this too high is similar to disabling the graph; too low and you may get more feedback than you need at the cost of training time.

NeuralWare ships first Linux version of the Predict 3.1 SDK

We are pleased to announce the shipment of our first Linux version of the SDK to **IBEX Process Technology Inc.**, of Lowell Massachusetts (www.ibexprocess.com). Ibex has previously licensed the Windows versions of **NeuralWorks Predict®** advanced neural network model development environment and the NeuralWorks Predict® Software Development Kit. The Linux version will allow Ibex to develop and target multiple operating systems and environments. **IBEX's** proprietary neural network and sophisticated mathematical software technology creates adaptive models which provide wafer to wafer metrology results predictions. The **IBEX Dynamic Neural Controller (DNC)** offers a "one-mind" neural network solution which incorporates multiple recipes and equipment maintenance history within a single model environment. The **DNC** offers a revolutionary approach to Advanced Process Control (APC) by using neural networks and non-linear mathematical techniques to analyze the state of a semiconductor manufacturing process, model potential improvements, and then offer recommendations that will improve the process. This enables the **DNC** to provide both wafer level run to run control as well as optimal maintenance corrective actions requirements simultaneously. The **DNC** represents the next stage in automating the use of artificial intelligence on semiconductor manufacturing equipment to improve yield by avoiding misprocessing and optimizing maintenance actions while decreasing operating costs within a fab.

Unlike traditional Automated Process Control solutions, the **DNC** integrates tool state-of-health status and predicted quality results because it takes into account not just process data but also the impact of maintenance actions and parts aging. The **DNC** uses this information to make recommendations to improve both quality results and operating conditions on a wafer to wafer basis. This enables the manufacturer to modify the process immediately or to plan for the best possible outcome. Also, the **DNC** is not process specific and can be configured to address most semiconductor processes. Robust alarm features in the **DNC** alert engineers before metrology goes out of spec so that they can prevent problems and not expose the manufacturer to costly misprocessing. The **DNC** provides customers with proactive maintenance recommendations and with Predictive Metrology™ results which provide the unprecedented ability to increase yield, reduce the opportunity cost of running numerous monitor wafers and minimize downtime and maintenance costs.



What can we help you discover?

Taking a look at Predict for Professional II/PLUS users

If you're currently a Professional II/PLUS user, have you taken a look at Predict recently? It's easy to request a demo and you will experience first-hand this user-friendly, yet powerful neural networking prediction and classification tool. The front-end data preprocessor uses a genetic algorithm and fuzzy technology to optimize your inputs prior to their going into the neural network. NeuralWare has many customers who rely on both Professional II/PLUS and Predict to solve their development and data modeling challenges. Contact sales@neuralware.com to order your demo today.

Personal License Extension Information

If you are someone who needs to use your NeuralWare software both at home and at work, you are a candidate for NeuralWare's personal license extension (PLE). With a PLE you can request a second license key for your home or laptop computer for the low one-time cost of \$250. Only users who are on the technical assistance program (TAP) are eligible for this benefit. To take advantage of the TAP/PLE program, contact our sales department for more information at sales@neuralware.com.

Canceling your subscription

If you wish to discontinue your subscription to the newsletter, send email to newsletter@neuralware.com and ask to be removed from the distribution list.

Additional Information

Additional information on NeuralWare is available at www.neuralware.com! We hope you will visit us!

About this eLetter

This eLetter is copyright 2002 NeuralWare. All rights reserved. This eLetter may be freely distributed as long as the above copyright notice is included in any redistribution, electronic or printed.