



February 2005

WELCOME TO SYNAPSE!

In This Issue...

On the Horizon – Projects with Partners

Into the Sunset – Support is Ending for Old Product Versions

Greetings!

We hope that the New Year has started well for you. It has for NeuralWare – which means we have been very busy! A well-attended and successful training workshop along with preparing proposals for some significant new initiatives conspired to prevent us from completing a January newsletter. However, in this February issue we'll share with you some background information about these exciting projects. **We hope these capsule descriptions will encourage you to consider additional ways that NeuralWare technology can contribute to your analytic and data mining efforts!**

Also, we want to let you know that **effective March 31, 2005** we will no longer provide support for old releases of NeuralWorks Predict and NeuralWorks Professional II/PLUS, and we will no longer provide these products for older operating systems. Please read the nearby article to see what product versions and operating systems are affected, as well as to see how you can take advantage of special pricing on our latest products to get back up to date.

Finally, don't forget that there is an Advanced Neural Computing workshop in February – see below for details. There is still time to register and attend!

We want to hear from you - use newsletter@neuralware.com to tell us how we're doing, and where we might improve.

On the Horizon – Projects with Partners

NeuralWare and other development partners have joined with the US Army Engineering Command's Edgewood Chemical and Biological Center in Aberdeen Maryland to propose the development of a comprehensive battlespace decision support system for identifying and mitigating chemical and biological threats.

NeuralWare has also submitted a proposal in conjunction with the Institute for Scientific Research, in Fairmont West Virginia, to develop an adaptive sensor exploitation system for

the US Air Force.

The NeuralWorks Predict® engine, and the NeuralSight® model development and evaluation platform will provide the underlying empirical modeling and data mining capabilities for both of these projects. We look forward to working with our partners on these important efforts later this year.

A Chemical/Biological Threat Decision Support System

Atmospheric contamination by toxic or lethal chemical and/or biological (CB) agents is a growing concern for American and Allied forces as well as civilian populations, both in America and around the world. The potential for widespread injury, infection, and even death is heightened by the fact that CB agents can disperse rapidly once they are released; small concentrations can disfigure, disable, or kill many people in a short time. Current practices largely rely on precursor events to trigger CB threat responses. Remediation and /or retaliation actions commence only after the launch and detonation of projectile devices known or thought to contain CB substances. Unfortunately, such conspicuous evidence does not accompany the surreptitious release of substances by individual terrorists willing to die in the process. As a consequence, responses to terrorist-triggered CB incidents don't begin until effects become obvious through the impairment of human activity or loss of life.

For many years, researchers at the Edgewood Chemical and Biological Center (ECBC) have been developing new technologies that show promise in remotely detecting and identifying hazardous substances in the atmosphere. One such patented technology, referred to as Mueller Matrix Spectroscopy, relies on polarization phenomena of laser beams reflected off molecules to generate what in effect are feature vectors. Then, a neural network is trained on patterns which represent hazardous, as well as benign, substances. ECBC personnel used NeuralWorks Predict to develop pilot models to demonstrate the viability of the approach.

In light of the success of laboratory and limited field testing to date, ECBC, NeuralWare, and several other organizations have joined forces to develop a comprehensive decision support system that would support acquiring, analyzing, and characterizing atmospheric data that could indicate a CB threat; in addition, there will be a full communication infrastructure and supporting back-end knowledge base that will offer actionable knowledge to cognizant battlespace or civilian hazmat leadership during CB incidents.

NeuralWare technology (the Predict engine and NeuralSight) will be used in developing the pattern recognition components that will identify toxic or hazardous substances based on spectral "fingerprints", as well as in the development of higher level decision support models that will assist theater leadership in making critical real-time logistics and remediation decisions.

Other organizations participating in this project include Quetron Systems, Inc.; Semiotic Engineering Associates, LLC; Advanced Technologies Application, Inc.; re² Inc.; the University of Pittsburgh Department of Electrical Engineering; the Institute for Scientific Research Inc.; and Industrial Scientific Corporation.

If you would like more information about this effort, or if you would like to discuss your own ideas for collaboration, please contact Jack Copper, CEO (jack.copper@neuralware.com or +1 412.278.6290).

Sensor Exploitation by Adaptive/Learning Systems

Recent advances in sensor, power, computation, and communication hardware have led to huge increases in the quantity of data generated in weapons systems. Furthermore, in combat situations opposing forces may attempt to confuse or disable sensing technologies by generating spurious data, which only adds to the processing load. With this flood of data comes a corresponding increase in both the quantity and complexity of problems associated with converting data streams into actionable knowledge, particularly when current data do not reflect values or distributions of values that were originally envisioned by the system designers. Despite progress towards refining special purpose algorithms to solve data quality and quantity problems in specific circumstances (e.g., error detection and correction codes in communication systems), the ability to fully analyze and utilize dynamic data across disparate sensing modalities in real world operating conditions has generally lagged behind the ability of sensor systems and subsystems to generate data.

Since it is not feasible to insert more human intelligence directly into the data acquisition – data conditioning – data analysis – asset action workflow, the alternative is to create more self-aware and adaptive analytic frameworks that dynamically evaluate current operating conditions and mission requirements and then adjust their processing and responses accordingly (either by direct self-modification, or at minimum by highlighting and prioritizing conditions and potential responses for remote use by humans-in-the-loop).

This will require an innovative framework and corresponding software architecture that will support building, validating, deploying, and updating models based on neural network adaptation and learning. In addition to providing extensible interfaces that can fully utilize advanced capabilities of current and anticipated next generation sensors and actuators, the architecture must also address the critical issue of updating legacy sensor systems that may be too expensive or difficult to replace in the near term.

The objective of this project is to improve the performance and reliability, and as a consequence the utility and cost-effectiveness, of existing and future sensor exploitation systems. Sensor exploitation systems based on (or retrofitted with, in the case of legacy systems) the proposed architecture will offer considerably more functionality and better performance for any given hardware configuration. The need for expensive custom systems will be reduced or eliminated, which will lead to reduced acquisition and maintenance costs. More hardware and software modularity and standardization across platforms will yield lower inventory and training costs.

The architecture specification generated in this project will drive the design and implementation of the corresponding modeling and evaluation capabilities into the next generation of NeuralWare's NeuralSight® product line. The testing strategies, and corresponding metrics for specifying confidence in model outputs will become integral elements of NeuralSight's model development and evaluation capabilities. Implementation of the test metrics will build on NeuralSight's existing training data audit trail facilities, so that the models produced by NeuralSight will be readily accepted in highly regulated

environments such as the emerging fields of biomarkers for disease detection and outcomes analysis in health care, in addition to mission-critical real time command and control systems. The underlying NeuralSight technology framework and its ability to seamlessly integrate a wide range of data source formats will provide a powerful methodology for rapidly developing and deploying comprehensive monitoring and analysis capabilities for use in stationary or mobile equipment and/or facilities.

The combination of NeuralWorks Predict and NeuralSight constitute a comprehensive fast-track model and neural network application development environment. When it is linked with the neural network verification and validation processes developed at ISR, the result will be a highly integrated, cost effective, and verifiable platform for developing adaptive models and infrastructures across a variety of problem domains.

NeuralWare is particularly interested in cooperating with organizations that have demonstrated sensor design and development expertise, in order to develop intelligent distributed sensor networks.

For more information about this project, and to discuss your own interests in collaboration, please contact Jack Copper, CEO (jack.copper@neuralware.com or +1 412.278.6290).

Into the Sunset – Support is Ending for Old Product Releases

During 2000 and 2001 we introduced significant new capabilities in NeuralWorks Predict, along with a major restructuring of the underlying Predict engine. These capabilities included Self-Organizing Maps, and GUI support for non-English fonts and character sets. In 2004 we introduced NeuralSight, which augments and extends the power of the Predict engine to offer even more automated model development and validation capabilities. In 2001 we also made internal architecture changes to Professional II/PLUS, and fixed several obscure bugs in the User IO program mechanism.

In 2005 we will be building on these improvements to NeuralWare core technology, and as a result, we will no longer provide support for versions of NeuralWorks Predict earlier than 3.0, and we will no longer provide support for versions of Professional II/PLUS earlier than 5.5. We also will no longer provide products for, or support, Windows 98, Windows ME, Windows NT, and Microsoft Excel 97.

NeuralWorks Predict Obsolete Product Versions

Support is being discontinued for all versions of NeuralWorks Predict and its predecessor products, including NeuralSIM, **earlier than release 3.0**. We will not be able to provide answers to questions about using these products, or applications based on models created with these products. **Please do note**, however, that models built with any release 2.x of NeuralWorks Predict can be loaded by any release 3.x. ***This backwards compatibility with 2.x models WILL be maintained at least through 2005.***

In addition, as we release future updates of NeuralWorks Predict, we will not test them with Windows 98, Windows ME, or Windows NT (Server or Workstation). We will also not

test future releases with Microsoft Excel 97. As a result, we will not be able to answer questions related to using NeuralWorks Predict with these older operating systems and/or version of Excel.

Professional II/PLUS Obsolete Product Versions

Support is being discontinued for all releases of NeuralWorks Professional II/PLUS prior to release 5.5. Standard future releases will be generated for supported Windows operating systems, Solaris on x86 platforms, and Red Hat Linux on x86 platforms. Other operating systems will be supported on a custom basis. Please contact NeuralWare to discuss your requirements for Professional II/PLUS on other operating systems.

Special Pricing for Upgrades

NeuralWare's neural network development environments are second to none – and we would like to make it easy for you to upgrade your old NeuralWare products to our latest technology.

Consequently, for a limited time only, licensees of discontinued product versions can get the latest NeuralWorks Predict or Professional II/PLUS on Windows x86 platforms at 2000 prices (\$1,995 for either product, \$3,750 for both products if purchased at the same time) – ***a savings of as much as \$1,000*** off the current list prices for these products! ***Plus***, get one full year of TAP support at no additional charge (this is 9 months of additional support – so an additional savings of potentially over \$550).

Please contact John Wavle, VP of Sales, at john.wavle@neuralware.com or +1.412.278.6292 to make arrangements for your new NeuralWare products today!

February Advanced Neural Computing Workshop

NeuralWare is offering special pricing when you purchase any NeuralWare product and a seat in the upcoming **Advanced Neural Computing** training workshop that will be held February 21 - 24 in Pittsburgh. Come learn how you can take advantage of advanced capabilities of NeuralWare technology, including Self-Organizing Maps and new NeuralSight features.

Commercial and government customers can take **20% off** the total price for **NeuralWorks Predict**, a 1 year **TAP** subscription, and **Training**, PLUS become eligible for **special pricing on NeuralSight**.

For pricing and other details concerning these special offers, please contact John Wavle, VP of Sales, at john.wavle@neuralware.com or +1.412.278.6292.