



NEURALWARE

## **Synapse March 2002**

NeuralWare participates in the BioMetrics Consortium Conference. NeuralWare was proud to be a part of last month's BioMetrics Consortium Conference in Arlington, VA as a participant and exhibitor. It was great to see some of our government, industry and education customers at this conference as well as some of the latest technological advances in the biometrics area. Our primary reason for participation in the conference was to demonstrate our research in the fingerprint recognition area. In addition, we welcomed the opportunity to engage in some stimulating and informative conversations about applying NeuralWare's technology to facial and other biometric-based personal identification and verification systems.

### **NeuralWare Awarded Contract**

NeuralWare is pleased to announce it has been awarded a contract to work with a government contractor on a field signature application. The four-month project started this month and is a great opportunity for our engineers to add to their real world experiences.

### **Training**

Register by March 31 for a NeuralWare course from our next 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 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 at [www.neuralware.com/training.jsp](http://www.neuralware.com/training.jsp), look for comments from previous attendees.

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 if you enroll in any of the courses listed below by March 31. Contact us today!

Current training schedule

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



April 29 - May 3  
 June 10 - June 14  
 July 15 - 19  
 September 23 - 27

Advanced Neural Computing (3.5 days)  
 May 7 - 10  
 August 12 - 15

**Newsletter Technical Support Tip:**

**NeuralWorks Predict Sensitivity Analysis Results**

One of many features in NeuralWorks Predict is an ability to compare the contribution that each input variables makes to the model's outcome, relative to other inputs used by the model. Our Sensitivity Analysis feature is described in the on-line documentation and Help system, but it's always beneficial to look at an easy to understand example.

The following table was produced by a Sensitivity Analysis run on our Soil Evaporation example. This is the sample problem introduced to users in the NeuralWorks Predict Quick Start guide.

Average	Max Soil Temp	Avg Soil Temp	Avg Air Temp	Min Rel Hum	Avg Rel Hum	Total Wind
NetOut01	1.283	-0.803	0.381	0.177	-0.921	0.205
Average Square	Max Soil Temp	Avg Soil Temp	Avg Air Temp	Min Rel Hum	Avg Rel Hum	Total Wind
NetOut01	4.712	1.085	0.309	0.080	1.052	0.109
Variance	Max Soil Temp	Avg Soil Temp	Avg Air Temp	Min Rel Hum	Avg Rel Hum	Total Wind
NetOut01	3.099	0.445	0.166	0.050	0.205	0.068

In the above Summary Results there is one value written for every original data field in your data, and 3 rows of information written:

**Average:** this line shown the trends, the + or - direction of sensitivity. A negative value means that IN GENERAL, increasing that field's value causes the predicted output to decrease; there is a negative correlation between that field and that output. A positive value means that IN GENERAL increasing that field's value causes the predicted output to increase as well.

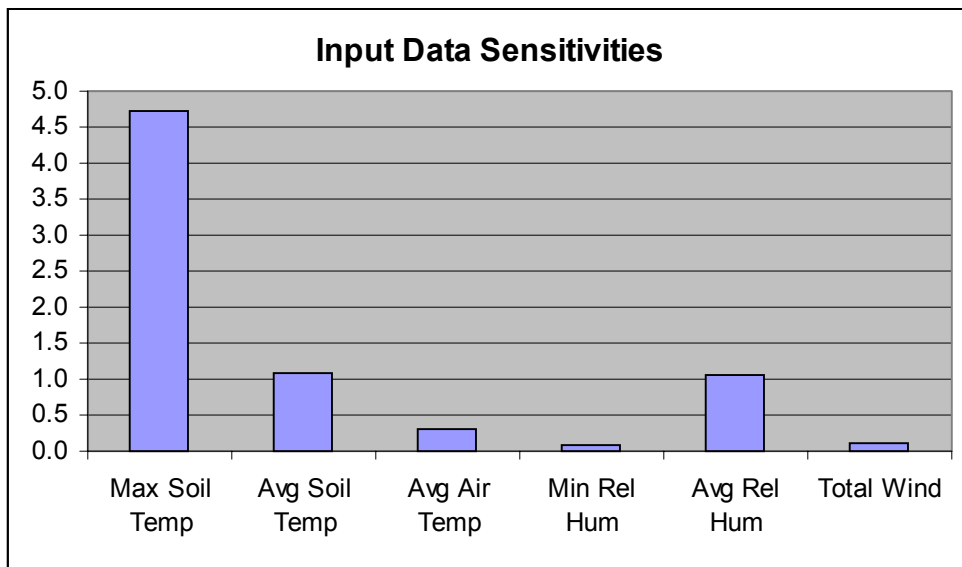
**Average Square:** this line shows best the magnitude of sensitivities, better than the Average. The directional information cannot be determined here, but if one field's value is four times that of another field, then it means that IN GENERAL the first field has four times as much impact on the output compared to the second field.

**Variance:** this is simply the variance of each field's column of sensitivities. Note that all three summary lines (average, averageSquared and variance) are simple statistical summaries run over the sensitivities of every data record. If you have 100 records of 20 fields, then internally



there is a 100 row by 20 column matrix of sensitivity values. The variance provides a confidence as to how much we wish to rely upon the AverageSquare and Average values.

In this particular example all input fields were in use; Predict did not remove input fields while running the Variable Selection component. Many applications do have inputs omitted by the powerful Genetic Algorithm processing of our Variable Selection component. Such fields would show up in the Sensitivity Analysis as having zero impact on the model's outputs.



The above chart shows the Sensitivity Analysis **Average Square** values. These results are from a trained model using our Soil Evaporation data. The chart highlights the significance of input number one. The Y axis scale is not important; only the relative height of each bar is informative.

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### Product Information

NeuralWare is currently shipping version 5.5 of Professional II/Plus. We have sent updates to all of our Professional II/Plus TAP subscribers, so if you are under TAP and have not yet received your update, please contact [sales@neuralware.com](mailto:sales@neuralware.com) and we will gladly assist you. We are currently shipping version 2.41 Predict and are working to get 3.0 Predict to users in the near future. Additional product information is available at [www.neuralware.com/products.jsp](http://www.neuralware.com/products.jsp)

**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](mailto:sales@neuralware.com).

**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.

**Additional Information**

Additional information on NeuralWare is available at [www.neuralware.com](http://www.neuralware.com)! We hope you will visit us often!

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