In This Issue

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Advertisement Enclosed: We have included an advertisement for Mendelsohn Enterprises, Inc. with this Technical Journal.

CSI accepts advertisements to accompany our Technical Journal for the sole purpose of defraying postage costs.

Technical Journal Philosophy and Purpose

Each month - come hurricane or high water - my staff and I prepare this journal which has a total circulation of about 40,000 per quarter. Our objective is to inform and educate CSI customers on technical matters and to help our readers trade better and smarter. This journal also acts as a forum for announcements regarding our service. It lets us keep the lines of communication open in what can be an impersonal, computer-dominated environment. Your comments, requests and suggestions have shaped this publication through the years.

We routinely send complimentary issues of our Technical Journal to former customers and to prospective customers who have inquired into our services. What better way to get to know a company than to read our comments, announcements and, yes, witness a full accounting of the errors

we committed in the past month? If it isn't obvious, our intent is to help you become a winner and, hopefully, to persuade you to join the CSI group.

If you are not a CSI customer and you are so satisfied with one of our competitors that you would never switch, so be it. We recognize that we can't please everyone. However, our priority is to reach those who either use our service or believe that they might. *If you feel you will never use any of CSI's data or software products, please cross off your name and address on the mailing label and mark it "REFUSED."* Give it to the postman and we will remove you from our mailing list. This way you can do your part to save a tree and we can concentrate on those who have a real need for what we can do for them. ✦

Sensible Trading Using Neural Networks & Fuzzy Logic Part 2

Last month we began this two-part article, focusing primarily on preparing data for a neural network through transformations, and on adopting an unbiased and defendable train-test cycle. This month we move forward with more neural network background and the fuzzy logic connection.

Neural Network Parameters Defined

Neural network training is much

akin to the act of optimizing parameter settings in a deterministic procedure for tracking a financial time series. The more you train the neural network, the more you optimize. Parameters in a neural net are represented by the inputs from which neurons are derived. The number of input stimuli in the first visible layer

and their combined representation at nodes in all hidden layers represent neurons. The total quantity of neurons determine the number of weights the network will address.

The number of weights in a neural network represent an upper limit for the parameter count. Because there is likely to be a serious lack of independence from one partially redundant input stimuli to the next, the number of parameters (in a statistical sense) for a neural network may be somewhat less than the number of controlling weights represented.

In previous Technical Journals, I have consistently stressed that in traditional model building, excessive freedom-restricting control in the form of parameters can flaw results. Too many parameters and hence too much so-called curve-fitting control will weaken the predictive powers of any model. This fact of model building transfers to neural networks with the same considerations. The "keep it simple" rule is as important with neural networks as with most other forms of statistical estimation.

There are, however, compensating counterbalances that may apply. If you have introduced too much control in your network, you can relax the hindsight-biasing effect by sacrificing speed and examining a greater number of samples. A sample in a financial model could be a day of data for all introduced stimuli. Introducing too much data for too long a period of conditioning time could, however, overgeneralize your model and reduce the precision of its real-time predictive power. In addition, at still greater liberties on speed, your model can be programmed to have an extended memory, a limited memory or both. There are many tradeoffs that should

FIGURE 1
FUZZY LOGIC OUTPUT CHART

be considered, but time and computer horsepower will force every researcher to introduce parameters and samples sparingly.
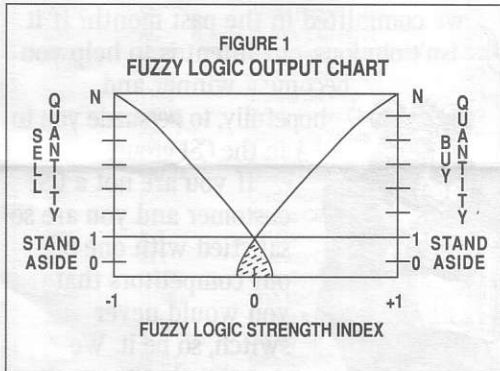
Fuzzy Logic

In the futures market, trade timing and money management score high on the list of outputs one may wish to determine. The act of buying or selling usually boils down to a dichotomous act. In mathematical terms this may be expressed as a truth value of 1 or 0. In some circles it may be thought of as 1 (buy), 0 (stand aside) or -1 (sell). Fuzzy logic can add a dimension of proportionality to the output of a neural network as demonstrated by figure 1. As the strength of either a buy or sell signal falls near the 0.0 level, the trader may stand aside or take a minimal position. As a network-determined strength index moves closer to 1.0, a larger long position would be budgeted and alternatively as the strength index nears -1.0, a larger short position would be justified. An overlap area near zero would result in standing aside and taking no position. Fuzzy logic principles would dictate such a proportional buildup as market intensity increases in favor of solid long or short positions.

The vertical scale on the buy and sell axes of Figure 1 would vary from 1 to N contracts of market exposure, depending on the trader's budget. The proportionality offered by fuzzy logic is simply a way to smooth out your investment and help amplify return when risk is at a minimum and minimize exposure when risk is high. Nearly every one of our involuntary human reflex actions is proportional. Likewise, building a sizeable position should be a gradual process and past history should be used to add sensibly to trading decisions.

Neural networks can be designed to answer several questions about a financial trading plan. Some research-

Software to Analyze Software and Protect Capital

Computerized trade timing systems are becoming the norm for traders, and few speculators today make trade decisions without them. Users of systems like CompuTrac, System Writer, Vantage Point, Swing Catcher, AIQ, MetaStock and others expect a respectable return for their money, but many such users fail to make money for reasons that can be easily corrected.

Two CSI software products that work with the simulated output of nearly any trading method, help to verify that your chosen approach will produce reliable post-development returns: Trading System Performance Evaluator™ (TSPE) tells how much capital is required to trade your system with a high rate of success, and Trader's Money Manager™ (TMM) duplicates TSPE capability and helps to amplify profits through market exposure recommendations.

Traders searching for ways to make money in the stock and commodity markets can spend thousands of dollars on a single trade-timing system and tens of thousands more in their application. Such systems typically perform hindsight testing on historical market data to discover the trading rules that would have produced profits in the past. Unfortunately, results from simulated testing often do not repeat when the rules are applied to current market situations.
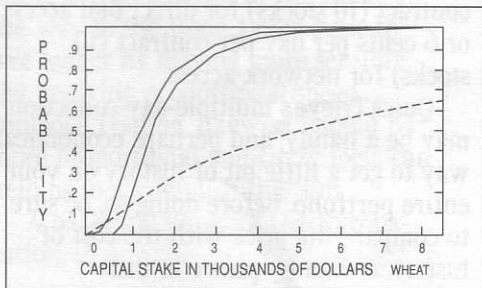
TSPE methodically degrades system results to correct for the imposition of freedom-restricting controls on historical information which excessively inflate simulated profits. TSPE then calculates a more realistic expected return and the corresponding required capital stake for a given chance of success. Both TSPE and TMM help to select from several candidate trading systems, allowing verification and certification of each trading system before funds are committed to the market.

These programs focus on trading system evaluation and money management instead of market timing. They rely on the details from timing systems for analysis. Once your timing system search has determined the system, market, and trade to make, TMM uses Monte Carlo simulation analysis to tell how many contracts or 100-share lots to trade based on accumulated profits. The result is increased profit with decreased marginal risk.
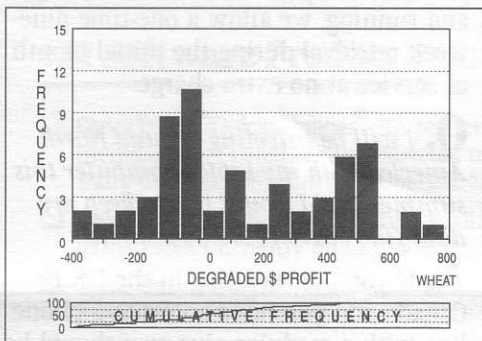
A brief list of real or simulated profits and losses are the program's main input. This record is entered easily by hand or imported as a file produced by your trade-timing software. The collective input implicitly describes the substantive characteristics of each timing system, enabling your computer to report on what is statistically likely to occur in actual trading.

TSPE or TMM in mature v. 2.1 releases should be an investor's first purchase after buying any market trade-timing product. They help you avoid losses due to account underfunding and help you certify that a trading approach is suitable for your limited capital. Following your first application, we believe you will conclude that no other software product has been more beneficial in protecting your capital. ✦
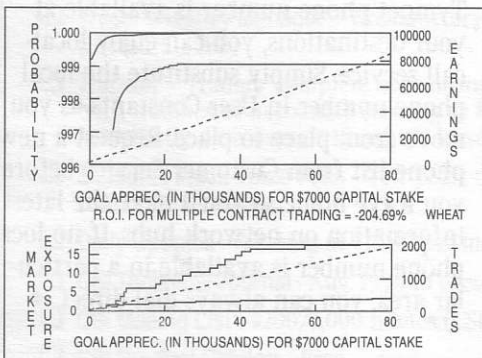
Ask Customer Service

Q. *I just added a new contract to my portfolio and ordered historical data to go with it. After I picked up my data, I found I had two files for the new contract. What went wrong?*

A. It sounds like you retrieved your daily update before picking up the history for your new contract. When this happens, QuickTrieve® first creates a file for the new contract in your portfolio - a file with just one day of data. When you pick up your historical data, it won't fit in the newly created file, so QuickTrieve creates a second file.

We're working on QuickTrieve version 4.05 which will automatically extend files as needed, but for the time being, follow these steps to combine your files manually: Use QuickManager's® (H) MOVE-SPLIT A DATA FILE feature to move the single update from its file into the larger historical data file. Verify the transfer by displaying a chart and note the assigned filename. Then use QuickManager's (B) DELETE DATA FILE FROM DISK feature to remove the file which holds only one day. Please be very careful to select the proper file.

Q. *How can I avoid duplicating new files in the future?*

A. To avoid having multiple files for the same contract when new contracts or stocks are added to your portfolio, always retrieve the historical data portion before requesting your daily update. If this isn't possible, use QuickManager's (C) CREATE DATA FILE ON DISK feature to make a file that is large enough for your history inclusive of daily updates before activating the daily retrieval session.

Q. *I added several new stocks to my daily update portfolio and got the last nine weeks of history through*

QuickTrieve's (A) COLLECT DAILY DATA feature. I was surprised to find that I was billed extra for the historical data. Please explain this fee structure.

A. Normal rates for daily updates are based on no more than 26 updates per month. Since there are usually 21 trading days in a billing cycle, you are allowed five updates more than are usually required. Double-accessing your portfolio for the last nine weeks would certainly put you over this limit. The price for extra updates (beyond 26 per month) of a custom portfolio is 5 cents per day per contract (10 stocks) for direct-dial access or 6 cents per day per contract (10 stocks) for network access.

QuickTrieve's multiple-day collection may be a handy, and perhaps economical way to get a little bit of history on your entire portfolio. Before doing so, be sure to compare the price with the cost of historical data by phone or disk.

There is one exception to this billing policy: To help get new subscribers up and running, we allow a one-time nine-week retrieval during the initial month of service at no extra charge.

Q. *I will be traveling around North America with my laptop computer this summer and I would like to keep my data files current. Is this possible?*

A. If you are traveling in the U.S. or Canada and you have access to a phone line with a modular plug, you should be able to call CSI. If a local Telenet or Tymnet phone number is available at your destinations, you can enjoy local-call service. Simply substitute the local phone number in User Constants as you move from place to place. Request a new phone list from Customer Service before you leave home so you'll have the latest information on network hubs. If no local phone number is available in a particular area, you can always dial direct. ✦

ers attempt to address all problems in a single network and some, usually more prudent investigators, solve each problem one at a time by using several networks. As a trader, one might want a network to establish 1) whether you should be long, short or neutral, 2) a critical level at which a stop loss should occur, and 3) how to react to a market strength index. It would be in this latter category that the fuzzy logic connection might be introduced.

Although my late father complained that as a teenager I drove with either the accelerator or the brake all the way to the floor, I now hope to live longer by driving more sensibly (by applying proportional speed control). Trading, likewise, should be more proportional and fuzzy logic can help us to accomplish this aim.

A backprop network (backpropagation, to newcomers) could be used to measure the forces which will lead to a market strength index that is reliable and which can translate into proportional market exposure. CSI's Trader's Money Manager helps to shed light on the proportional market exposure problem. Like the neural network, it uses random simulation analysis to arrive at a solution.

Some neural network researchers wrongly believe neural networks are the answer for people who want to avoid statistical analysis. Of course, this is not true. Concepts of estimation theory and statistical manipulation will make a neural network perform with greater precision. Carefully thought-out data transformations will trim training exercises to a fraction of that required for a poorly conceived application. ✦

Bob Pelletier

Anyone who has been burned by gimmicks and fads in the past may be quick to dismiss these new technologies as another sham. Please don't. If you want to stay on the cutting edge of the latest technology, give neural networks and fuzzy logic your full attention. They are based on sound principles and deserve a great deal of analytical respect. The Futures Industry is probably one of the most exciting areas where neural networks and the more recent companion technology of fuzzy logic can be fruitfully applied.

CSI Software Product Summary

- ❏ **QuickTrieve®/QuickManager®** - To retrieve, manage & edit data; includes Alert Calendar: Unrestricted use $99, Daily data user $39 and 4.04 Upgrade $29
- ❏ **QuickPlot®/QuickStudy®** - Charting & analysis software (requires QT/QM) $156 Currently on sale @ $99
- ❏ **Trade Data Manager™** - Macintosh downloader & accounting program; includes 1st month of updates $99
- ❏ **Trading System Performance Evaluator™** (TSPE) - Computes your system's capital requirements $199
- ❏ **Trader's Money Manager™** - Introductory price $499 (includes TSPE)
- ❏ **TraDe$k™** - Traders' complete accounting system-(price varies with number of accounts) Starting @ $399/Unrestricted use $299/Daily data user or 12-month lease starting @ $22/Mo.
- ❏ **Seasonal Index Value Pack** - Ten years of history for 33 popular commodities $444
- ❏ **Daily Updates** - Starting at $10.80 per month
- ❏ **CSI Technical Journal** - Aug. 1990 to present $35/Yr. or $5/Reprint
- ❏ **CSI Mailing List** - $200/1,000 names (CSI users omitted)
- ❏ **CSI Product Catalog** - Free

❏ CHECK　　❏ MASTERCARD　　❏ VISA

AMOUNT ENCLOSED $ _____

CARD # _____

EXP. DATE _____

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SIGNATURE _____

USER ID#: _____

❏ 5¼" DISK　　❏ 3½" DISK

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All prices subject to change without notice.