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DATA ♦ SOFTWARE ♦ SERVICE

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## De-Mystifying the Magic of Neural Networks

Neural Network mania has relaxed somewhat in the investment industry and its description appears to have mutated into "intermarket analysis." I hope the waning of neural network interest means only that the more frivolous players have gone from the arena. The neural net remains a viable form of market analysis in a different league from fads like candlestick charts, point and figure charts, etc. It can capture significant substance from market data and can offer market insight that might more readily be translated into profits.

One reason neural networks may be losing popularity is that they are not well understood. The combination of anatomical buzzwords and mysterious hidden layers make them seem more in the realm of magicians or witch doctors than the reality of scientific investigations. Nothing could be farther from the truth.

From an anatomical aspect, the neural network mimics the function of the human brain. I have been asked, why, if a neural network looks at past patterns and associations to predict the future, can't I use my own neural network (my brain) to predict just as efficiently? Why not just stick with the real McCoy?

The answer lies in the complexity of the interaction of inputs. We are often surprised at the tricks our minds play when we try to process routinely simple challenges to our reasoning

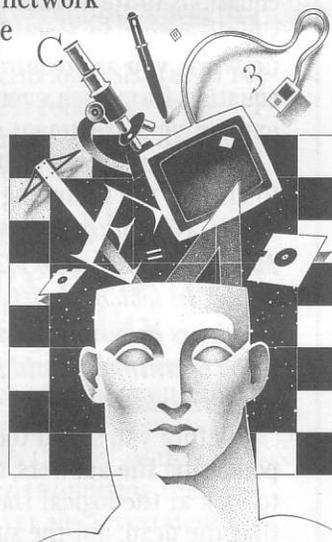
powers. The neural network, when properly programmed and trained, applies what may appear to be magic by cutting through irrational reasoning which might easily confuse mere humans. This ability lets it capture the logical truth better than your powerful brain.

Solutions to market trading problems are often a question of mathematics. The neural network operates upon truth tables, mean square errors, geometric or causal patterns and a weighted collection of stimuli. In the financial world, the network pulls apart intermarket

relationships, and/or market momentum algorithms. This lets us discover their effect and impact on the market or markets we hope to predict.

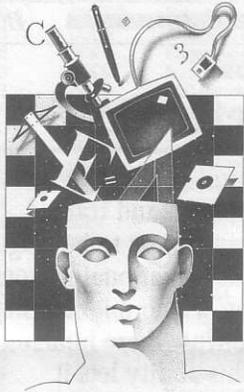
In mathematics, the simple acts of squaring and the taking of square roots (unsquaring) are fundamental to the solving of many problems. When fitting a curve through closing prices to produce a model, the method of least squares is often used. This applies an arithmetic process which minimizes the sum of the squares of the deviations (errors) between the actual observed data and the curve or model that will be the short hand form of the relationship we hope to explain. The act of squaring the errors tends to amplify the weight given the largest deviations. Using such methods gives the best fit for the data in question

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## De-Mystifying the Magic...

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***“The neural network forces the user to introduce rules that are germane to the problem. This allows it to throw out the non-pertinent factors that may have been largely overrated by our irrational minds.”***

and will have accomplished the feat of minimizing errors for the simple curve (possibly a straight line) proposed to represent the data. A model could be derived that would represent the minimum linear sum of errors as opposed to the sum of squares of the deviations. This would weight all points linearly and would give less proportionate weight to points that are extreme.

A computer can be given simple equations to formulate very logical and simple events. In formulating a neural network, you are required to place in equation form such events that help to explain your treatment of the process.

How would you write an equation to answer the following question?

*If a U.S. plane crashes on the Mexican border with 182 people on board, in which country would the survivors be buried, and how many pairs of animals could Moses' arc accommodate?*

Before you spend too much time pondering the answers, take a moment to look at the logical flaws. Recognize that the dead, not the survivors, should be buried and that the Biblical arc was built by Noah, not Moses. Yet, because every question becomes an immediate challenge, most of us attempt to reply to what the question suggests is demanding for an answer. The neural network forces the user to introduce rules that are germane to the problem. This allows it to throw out the non-pertinent factors that may have been largely overrated by our irrational minds. The neural network would have immediately recognized that this question “does not compute.”

To challenge your child the next time you present a gift, show three boxes with inscriptions as follow:

Your gift  
is in here

Your gift  
is not in here

Your gift  
is not in box 1

Tell the child that only one of the three inscriptions is true and ask him

or her to select the box containing the gift based on the information provided. If the wrong box is chosen, another chance will be given the following day, but not before.

This dilemma will likely keep the child busy for at least a minute or two, (that is, if the challenge is accepted and an immediate guess isn't made). The computer, on the other hand, can solve this problem immediately using a simple truth table or the equivalent. The fact that only one inscription is true means that two inscriptions must be false. Our brains easily mix up the true and false identifications and we may be forced to enumerate all the combinations of true and false as we examine the inscriptions. Box 2 holds the only gift, making box 3 the box with the only true inscription.

Trick questions like this are fun ways of fooling most of the people most of the time, but they will never fool a properly programmed computer any of the time. The computer isn't smart enough to fall for the trick. Remember this the next time intuition tells you to make a trade in the market.

Humans are great at recognizing faces and quite poor at solving logical problems. Computers are great at solving logical problems, but they are virtually worthless in recognizing a face. This is part of the reason why the computer is so effective when undertaking neural network analysis. Let us hope that innovative neural network trading systems continue to become available to break new ground for investors. ♦

*Bob Pelletier*

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## IPO Information Sheds a Dismal Light on New Issues Market

We've all heard it before. The voice on the other end of the telephone wants to let you in on the initial public offering of a great new stock. It is immensely promising and unbelievably cheap. However, to get in on this ground floor offering, you'll need to purchase, say, 5,000 shares.

It sounds tempting. If what he says is true, you stand to double, triple or better your money in just a few weeks! Why not take the risk? Why not? For starters, the statistics show that, at least in the short run, the odds are stacked heavily against you. Here's a little study we did on the IPO information we report:

Each month on the Market Statistics pages of this journal, we list the initial public stock offerings from the NYSE, NASDAQ (OTC) and Amex exchanges. Along with the CSI number, symbol, name, offering date and recent closing price, we show the percentage change between the high-low average on the first trading day and the price on the day the report is prepared. The offering date could be anywhere from a month to a few days before the publishing date. We thought it would be interesting to see how the IPOs had fared during this short, initial trading period covered in their debut listings.

From November '93 through February '95, we reported 1,243 initial public offerings. At the times of publication, only 502 had posted profits and, of those, only four had gone up by more than 100%. Nine had advanced more than 45% percent. Nearly half of the 502 profitable issues had gained a feeble 2% or less.

On a month-by-month study, we found that the ratio of winners to losers was overwhelmingly negative. A chart of these ratios (below) shows that in the 16 month study, on only two occasions was there a modest edge of winners over losers. We calculated the ratio (R) scale using the following formula:

If  $W > L$ , then  $R = (W/L) - 1$ ; If  $W <$

$L$ , then  $R = 1 - (L/W)$   
Where:  $W$  = number of winners (profitable stocks)  $L$  = number of losers (unprofitable stocks).

Short-term analysis: The next time a voice on the other end of the line offers you a great opportunity in an IPO, remember that the statistics heavily suggest you should respectfully decline. Long term analysis: Yet to be determined. We'll follow up with longer-term studies on how the IPOs have performed in future journals. ♦

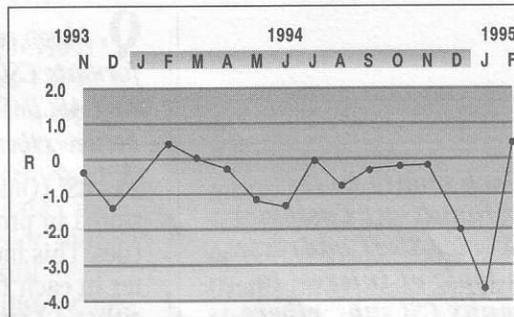
## Software and Data Preference Polls: Not a Gauge of Quality

It's that time of year again. Stocks & Commodities Magazine ran its annual "Reader's Choice" contest and the winners are trumpeting their accolades all over the investment rags. This brings up the annual controversy over user preference and just what "Reader's Choice Winner" really means.

For those of you who don't read S&C, let me explain the competition. The subscribers of Stocks & Commodities were sent ballots listing advertisers and potential advertisers of the magazine. They were asked to select their one choice in a number of categories. Let me be clear on this: They did not compare the competing products or services as good, bad, worst, etc.... Nor were they asked to rate individual aspects of the contestants, such as quality, service, etc. The winner in each category was, quite simply, the one with the most votes.

The fact is, the so-called "Reader's Choice Award" in each category of software or data has absolutely nothing to do with the quality and

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IPO PERFORMANCE

### *What do you think?*

*People often ask us how CSI's service compares with other data vendors. Not having had personal experiences with the competition, we can only give our side of the story. If you know of ways you would like us to improve our service or if you would like to comment on characteristics of our service that you find appealing, please send them to: The Editor, CSI Technical Journal, 200 W. Palmetto Park Rd. #200, Boca Raton, FL 33432. We will give full credit for any comments we print.*

## Ask Customer Service

*Each month in this column, our Customer Service Staff addresses a topic of interest to many CSI subscribers. This month they will address questions about data formats and ASCII conversions.*

**Q.** *I keep reading about the various formats: CSI, Metastock, CompuTrac and ASCII. What is the difference between them?*

**A.** CSI (QuickTrieve®) format data is stored in program-readable, binary files. This means nearly every character in each file is efficiently stored as either a 1 or a 0. Unique to the CSI format are the QMASTER file, which is a master list for each directory, and data files with names ending in the .DTA extension. The QuickTrieve format is widely accepted by analysis programs.

The Metastock format is essentially the same as the original CompuTrac format developed by the Technical Analysis Group of New Orleans in the early 80s. These are also program-readable binary files. Metastock files are easily identified by a MASTER file for each directory and two files (one ending in .DAT and one ending in .DOP) for each contract or stock. This format is also widely used by analysis programs for traders.

ASCII (pronounced as 'kee) data is stored in alphanumeric characters that can be read. It is preferred by many for its simplicity, but it is the least efficient for storage and management. ASCII data files typically do not have corresponding master files and often have file names ending in the .PRN extension.

It is important that you store your data in the format or formats required by your analysis programs.

**Q.** *I've been charting my CSI data with QuickPlot® for years, but now I'd like to try an analysis program that only reads ASCII data. Can I use the data I have already purchased from CSI?*

**A.** Under most conditions. QuickManager's® Convert Subsystem includes the option of converting TO ASCII files. You may choose between our standard record layout (date, open, high, low, close, volume and open interest) and

any custom record layout you wish to define. If you select a custom file layout, you can save your specifications in a "mask" for future conversions and updates.

**Q.** *Once I convert my data files to ASCII, how can I keep them current?*

**A.** To update ASCII files, you must first store the data in the CSI format. After distribution to the CSI files, proceed to QuickManager's Convert Subsystem. You'll have the choice of converting the entire file to ASCII or appending the data that has accrued in the days since your last update.

**Q.** *Is there any way to automate the daily updates of my ASCII files so I don't have to go through the Convert Subsystem every day?*

**A.** Yes and no. The process of converting to ASCII must be done through QuickManager's convert subsystem as described above. However, you can store all the necessary keystrokes in a macro that will automate the procedure. We recommend that you manually convert your files several times before attempting to create a macro so that you'll be familiar with the process.

Use QuickTrieve Automation to create your macro: After a daily update from CSI, press <ALT><R> to Record your macro. Assign the macro a single-character QA# as prompted. (We suggest A for ASCII, if not previously used.) Then go through the menus, selecting the prompts necessary to convert or append your ASCII files as desired. Use the default selections whenever possible because your keystrokes will be repeated in exactly the same sequence whenever the macro is used. When finished defining your macro, press <ALT><R> again to save and terminate the macro definition process.

After your next update, press

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## Notes from the Data Base:

### 2-Yr. T-Note Quotes -

The CBT's Two-Year Treasury Notes (CSI #207) are traded in increments of 128ths. None of the QuickTrieve, Metastock, Trade Data Manager™ or CompuTrac/M formats support figures quoted in this increment. Although we maintain the true values quoted by the exchange in our data base, we round the figures to the closest 64th to accommodate existing data formats and analysis software.

### Seasonal Index Update

We have re-calculated our exclusive CSI Seasonal Index data so that the series now includes trading activity for

1994. The differences from previous years are subtle, but relevant. The new series, like all previous editions, repeats the same data year after year so that multi-year studies may be performed. The re-calculated "Code 62" data can update earlier "Code 62" files or your history can be replaced for full continuity. Normal "Assisted History" or "History on Disk" rates apply for your Seasonal Index order. A Seasonal Index Value Pack including a ten-year history on 33 commodities is available for \$315. Previous Value Pack purchasers may order a complete replacement using re-calculated data for \$50. ♦

*Please contact Customer Service to order Seasonal Index Data. It is not available via the Order Subsystem at this time.*

## CSI Software Product Summary

Please check all that apply and complete the information box at right.  
Mail or fax to CSI, 200 West Palmetto Park Road, Boca Raton, Florida 33432; Fax: (407) 392-7761

- QuickTrieve®/QuickManager®** for PC - To retrieve, manage & edit data (includes 1995 Alerts Calendar); New daily user \$59. QuickTrieve/QuickManager version 4.06 upgrade (for current QuickTrieve users only): \$39; demo disk \$5
- 1995 Commodity Alerts Calendar** for use with QuickTrieve \$20; Calendar upgrade for current QT 4.06 users \$10
- QuickPlot®/QuickStudy®** for PC - Charting & analysis software (requires QT/QM) \$89
- Trade Data Manager™** - Macintosh downloader & accounting program \$59; upgrade \$49 or *FREE* with \$100 history order
- Trading System Performance Evaluator™ (TSPE)** for PC - Computes your system's capital requirements \$149
- Trader's Money Manager™** for PC - \$399 (includes TSPE); Demo disk: \$15
- TraDesk™** for PC - Traders' complete accounting system - CSI daily user \$149; Unrestricted use \$299; 30-day trial version \$22
- Seasonal Index Value Pack** for PC - Ten years of history for 33 popular commodities \$315
- Daily Updates** for PC - Starting at \$10.80 per month
- CSI Technical Journal** - Aug. '90 to present \$35/Yr. - \$5/Reprint
- CSI Mailing List** - \$200/1,000 names (CSI users omitted)
- CSI Product Catalog** - *FREE*

Please add \$29 per software package for overseas shipping.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

DAY PHONE ( \_\_\_\_ ) \_\_\_\_\_

USER ID# \_\_\_\_\_

#### DISK PREFERENCE

5.25"/360K  5.25"/1.2 MB (HIGH DENSITY)

3.5"/720K  3.5"/1.44 MB (HIGH DENSITY)

#### METHOD OF PAYMENT (PREPAYMENT REQUIRED)

CHECK  MASTERCARD  VISA

DISCOVER  AMERICAN EXPRESS

AMOUNT ENCLOSED \$ \_\_\_\_\_

CARD # \_\_\_\_\_

EXP. DATE \_\_\_\_\_

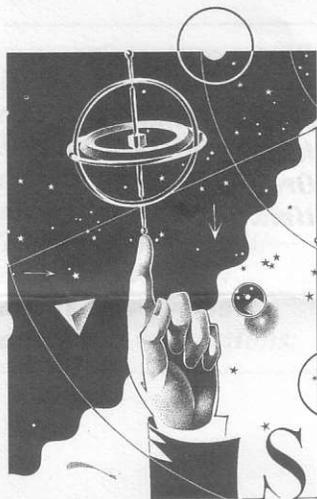
SIGNATURE \_\_\_\_\_

3/95

All prices subject to change without notice.

## Software and Data...

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*"There is more product longevity and satisfaction in quality than any other attribute of performance."*

performance of the product. Most readers may have known of only one product in each category. Regardless of the superiority of the other products about which nothing was known, the product familiar to the reader got the vote.

While this type of balloting shows the product most frequently used by S&C readers, it does not say on what basis (or under whose influence) the choice was made. None of us can know the private list of candidates each reader was familiar with when casting a vote. In this flawed study, a non-vote due to unfamiliarity with a product carried the same weight as a non-vote due to a bad experience.

The editors at S&C are the first to point out that quality has no bearing on the outcome, but this message is lost in the media circus created by the winners. Metastock used their win to promote their software when compared to a competitor. Likewise, another winner showed their multiple awards in a recent magazine promotion.

Using S&C's "Reader's Choice Award" as evidence of progress in one's own accomplishments brings to mind George Santayama's quote, "Those who speak most of progress measure it by quantity and not by quality." There is more product longevity and satisfaction in quality than any other attribute of performance. Unfortunately, S&C left quality out of their questionnaire.

It is interesting to note how very laudable the study seems to the winners and how very biased it appears to the dozen or more losers in each category. As a "Finalist" in the data service category, we find ourselves in the crowd shouting "foul." When CSI lost out to competing data services, we felt compelled to advise S&C of the flaws in their study. Neither of the two letters we submitted to the editor, making several valid claims of bias, were accepted for printing. ♦

## Ask Customer Service

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<ALT><P> to Playback a macro. At the QA# prompt, enter the character you assigned to this macro. (We suggested A.) QuickTrieve will proceed through all the screens and keyboard responses you entered previously.

You may have to experiment with this feature a few times before you get it right. If you make a mistake while creating your macro, just press <ALT><R> to end the current macro and start again. Each time you re-use a QA# when naming a macro, you overwrite the previous macro with that identifier. Macros must always be started from the same point in the program where they were recorded. This is because the macro remembers the keystrokes entered, not the specific point at which the macro should begin.

You may find that you want to include more in your macro, such as data retrieval, chartmaking and analysis. For more information on QuickTrieve Automation, please refer to pages C14-16 in the QuickTrieve manual or pages E10-18 in the QuickStudy manual. Please call Customer Service if you need assistance.

**Q.** *I converted some old data from ASCII to QuickTrieve format, but when I try to chart it, the graph is full of spikes and discontinuities. What's wrong?*

**A.** It is possible that your original ASCII files were missing days and perhaps had some erroneous data. Any time you are using data you didn't receive from CSI, you should run it through QuickManager's Data Integrity Checker. Then you'll know if the data is worth correcting or if you should just start over with new files from CSI. ♦