

BrainCapital Technologies (S) Pte Ltd

Company No. 200511255W



.....Powering Financial Markets

Tel : 65-62841789
Support : 9154-6326

Email : dealing@dealingmachines.com
Website : www.dealingmachines.com

Copyright © 2000 Viceroy International Limited

***** Document Confidentiality *****

This Document contains Privileged / Confidential Information that is strictly covered by confidentiality clauses. To read this document, you must be authorized by Viceroy International Limited . If you are not, you must not read, copy or deliver this document to anyone. In such case , you should destroy this document and kindly notify Viceroy International Limited (dealing@dealingmachines.com) .

Background

- The history of BrainCapital technologies has its humble beginnings in 1988 . David Lee secured a Singapore Merchant Banking Scholarship which led to stints in Goldman Sachs New York and trips to Chicago Trading Houses . This helped to incubate an idea to develop a machine driven program-trading software for foreign exchange .
- David with help from scientists came up with the first version a couple of years later and subsequently in April 1993, made a presentation of his model and findings at the SECOND ANNUAL INTERNATIONAL CONFERENCE ON ARTIFICIAL INTELLIGENCE APPLICATIONS ON WALL STREET. The underlying pattern recognition technology has undergone much refinement ever since.
- Between 1993 and 1997, the software was used extensively by program traders at Hong Kong Bank, Swiss Bank Corp and BHF Bank.

Subsequently , a governmental grant and venture capital group funding by Boston based VC followed in 1998 .

Since then , Braincapital technologies has been used by several MNC banks and also a Top 10 program trader who traded 12 percent of stocks on the NYSE.

The technologies use state of the art artificial intelligent technologies like neural nets , fuzzy logic and genetic algorithms . Through millions of computational intensive mathematical calculations , the technologies output a 6 step best scenario for each individual stock , bond or currency .

Statistically , **it can be verified** that the technologies has a **65 to 80 percent accuracy rate of predicting price momentum** (speed of trend) for intraday , daily and weekly time spans.

Viceroy International Limited in 2002 completed the 100 percent buy back of BrainCapital technologies . In 2005 , Viceroy International Limited with the support of HSQ Digital products , completed the integration of Hsquote financial data feed with BrainCapital technologies .

Licensing

We are keen to explore country specific distributorships . We welcome proposals from data vendors , technology providers, brokerages, investor educators and other business partners .

HS NEURAL SCREEN



The main distinguishing feature is found in the 3rd and 4th panel where a look forward 6 step prediction is made beyond the current price today . This is represented by the yellow line which is the predicted Momentum for next 6 periods . The blue line below the yellow line is the reverse engineered price of the predicted momentum .

As there is a proven statistic of predicting momentum by 75 percent accuracy , those traders who understand momentum well can visualize what the look forward price shall be so that the accuracy of the system becomes 75 percent accurate in predicting prices . Add to that a martingale like form of trading strategy , it can further improve entry and exit levels and lead to very profitable trading strategies for hedge funds.

Product Technology

A Hybrid Pattern Recognition System basically recognizes patterns in systems and expresses it as a mathematical formula using a combination of different fields of mathematical studies. Since the mid-1980's, such artificial intelligence (AI) has been used for industrial and commercial applications. Well-known examples include: Mitsubishi Electric's combination of neural net technology with optical technology to create the first optical neuro-computer that could recognize all 26 letters of the alphabet in print; Nippon Steel's construction of a blast furnace with self-regulating features to adjust the most optimal temperature, oxygen levels and air velocity within the furnace; and NEC's cooperation with Daiwa Securities to build a supercomputer that recognizes price patterns on the Tokyo Stock Exchange. The proliferation of AI is already extended into our homes in the form of smart air-conditioners, intelligent scanners and neuro-fuzzy washing machines.

The BrainCapital Pattern Recognition and Extrapolation Technique

In the case of BrainCapital's Hybrid Pattern Recognition System (we call it the "BCT Engine" for short), the process starts off with actual historical traded prices. Historical data with at least 500 data points is fed into a series of computer systems that will perform billions of calculations. The data points are segregated into several statistical dimensions such as the standard deviation, the mean, the direction of change, the magnitude of change, the timing between changes, etc.

Based on the actual traded historical prices, the BC Engine will then derive a set of non-linear mathematical formulae that will simulate the actual price pattern. Using non-linear technologies ("NLT"), the system will then generate a line of 'best-fit' synthetic price. NLT technique basically re-iterates the mathematical formulae or equation billions of times but unlike a pure 'trial-and-error', NLT refines the formulae with each iteration to bring it closer and closer to the actual price pattern. Hence, at an optimal number of iterations, the synthetic price pattern will mimic the actual price pattern. Using this line of 'best-fit' mathematical formulae, one can then extrapolate forwards in order to generate a future price pattern.

The entire process described above is what we call 'training the data'. By providing a live-feed, the system is re-trained continuously each time new data streams in and a new forward-looking price pattern is extrapolated. In this way, the computer actually 'learns' as new information (i.e. pricing data) becomes available.

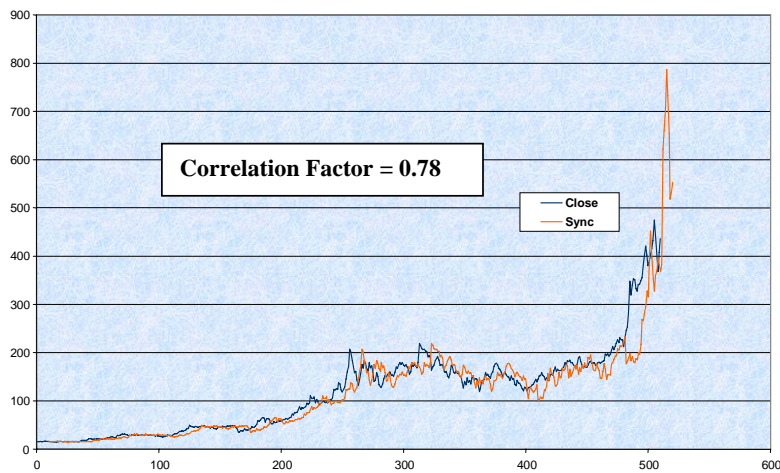
Characteristics of the BCT Engine

BrainCapital's technology uses non-linear technologies to generate a synthetic price pattern that closely resembles that of the actual traded prices. The mathematical formulae behind synthetic price pattern can then be extrapolated forwards and used as a forecast estimate on how prices will move in the future.

Early trials of the synthetic's predictive capability has shown that:

- The 'look-ahead' price pattern is fairly accurate (up to 70%) in predicting the direction (but not necessarily the magnitude) of price movements. Although the actual magnitude of change in prices can be quite different from the synthetic, we believe that predicting the future direction has more implications on profitability than the actual magnitude of change.
- The 'look-ahead' price pattern is fairly reliable in predicting up to 9 trading movements (what we call 'steps') ahead. At the current stage of the technology, beyond 9 steps, the predictive power drops significantly. What this means is that if we are tracking historical price movements on a daily basis, then the look-ahead is reliable up to 9 days ahead. And, if we are tracking historical price movements at 5-minute intervals, then look-ahead is reliable for up to 9 steps or $9 \times 5\text{-min intervals} = 45\text{ minutes}$.

Figure 1: Predicted vs. Actual stock price of Yahoo!



What's so special about the BCT Engine?

The BCT Engine is an extremely powerful forecasting tool with a very high level of accuracy. (In our sample trials, the correlation between the synthetic pattern and the actual patterns was about 0.78.) This is because the technique combines some of the most advanced mathematical sciences available to generate a pattern forecast. The following bullet points summarize the strengths of BrainCapital's BCT Engine vis-à-vis other conventional financial forecast tools.

- The **ability to 'learn' and adapt** to the ever-changing environment is perhaps the most powerful feature of the BCT Engine. This 'learn-as-you-go' feature is unlike other financial models that are based on static mathematical formulae and cannot account for the changes in the society, the advances in technology and the evolution of the market environment over time.
- The BCT Engine **generates an entire look-ahead pattern** by forecasting up to nine steps ahead, unlike other methods which are considerably short-sighted and provide only directional forecasts for the next immediate step in price movements.

Critique:

It is appropriate at this stage to discuss a common critique of BrainCapital's methodology of pattern projection – that the methodology does not factor in external information and news. In rebuttal to this critique, it is necessary to point out a school of thought in financial academia – that every relevant piece of information that will affect the value of a product is already reflected in the market price of that product. After all, the rise and fall of the market price of a product IS the result of any known information, including both measurable data such as trade flows and intangibles such as market sentiments. In other words, the market price itself is the singular measurement that most accurately and most comprehensively captures all of the available and relevant information that could affect the underlying value of any financial product. In fact, much of financial technical analysis today inherently assumes this. This is also substantiated by the fact that there are already many existing trading models that use only price as the sole input.

****The contents of this paper is solely for information purposes and may contain errors or omissions and may be subject to alterations without notice to the reader.**