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APPLICATION WATCH

Investing in Genetic Algorithms

The world of financial investing has changed dramatically within even the last five years: The choices of where to put your money have grown exponentially, but the constraints have expanded as well. According to Sri Sankaran, director of research at LaSalle Portfolio Management (Chicago, Ill.), whose assets top \$750 million, the traditional approaches to constructing financial portfolios were no longer practical. Says Sankaran, "The choice was either getting a Cray and working classical nonlinear optimizations on it or putting a genetic algorithm on a PC." Obviously, purchasing a software package for an existing PC was more cost-effective. Sankaran had read about genetic algorithms from trade magazines and decided to try them out.

For the last two years, Sankaran has been using GenSheet by Inductive Solutions Inc. (New York, N.Y.), which builds proprietary case-based reasoning, neural network, and genetic algorithm models for the financial industry. Although Sankaran was unfamiliar with using genetic algorithms and he also had to learn Excel, GenSheet was user-friendly and it took only two months to get the system up and running. Whereas classical mathematical techniques would take eight to nine hours to come up with a solution, the genetic algorithm package worked quickly. According to Sankaran, "It's a remarkable program; the solutions made sense."

While only Sankaran actually operates GenSheet, in an office of 10 people, he says, "GenSheet is transparent. People are using it (via the spreadsheet) and probably don't even know it." For LaSalle Portfolio Management's purposes, only Excel and a 486 PC were needed to run GenSheet.

The complexities of constructing a financial portfolio are many. Investors often have a short time horizon, typically 90 days. Some investors may wish to put their money in, say, 10 "fixed-income instruments" (bonds). Then other criteria is determined by bank regulations such as you can't have more than 10% of your portfolio in Instrument X, there are limits to the amount of money you can lose, and you must keep in check rising interest rates and price behavior. Other criteria could also include risk-return and liquidity. According to Sankaran, some transactions, that normally wouldn't be allowed due to bank regulations, can proceed if other transactions are completed. "Classical mathematical techniques can't handle these contingent transactions," says Sankaran. "That's why genetic algorithms are ideal for this situation of meeting a variety of constraints."

The problem becomes even more interesting because of the unlimited number of instruments available to investors. After the outside constraints, investors may impose their own practical reasons, such as wanting to invest in no more than five instruments. "The trick is that you have to convert the English constraints into Algebraic constraints on the spreadsheet," says Sankaran.

Once the information is input, GenSheet provides Sankaran with a solution, which he then "stress tests," reverses the procedure, to make sure the solution is optimal. Sankaran has been satisfied with the results. Would classical mathematical techniques come up with the same results? "Sure," says Sankaran, but with a catch: "If I had a 1,000 hours. This system saves months. The window (for investing) is only open for a short period of time. The system lets you take advantage of that window of time." ■