

Legend's Neural Network Uses AI for Asset Allocation

NEW YORK — For 10 years now, **Legend Advisory Corp.** (owned by **Legend Group Holding**) has been quietly applying artificial intelligence to asset allocation with AANN, its Asset Allocation Neural Network.

"After 10 years, Legend was way ahead of everyone else, so we could let the world know and it will take others years to catch up," says Shashi Mehrotra, Chief Investment Officer of Legend Advisory Corp., which is a registered investment advisor.

Artificial intelligence offers an advantage over the standard quantitative models for asset allocation, according to Mehrotra. "Artificial intelligence had an advantage because it's not linear in nature," he says. "Most other quantitative models are linear or deal in three dimensions at most. Unfortunately for us, financial markets operate in way more than three dimensions. They can have eight dimensions. The fourth dimension is time. Other dimensions are risk, return and many other global factors."

Another benefit of artificial intelligence is its ability to learn as it operates. "Every year, AANN has gotten better and better and better," says Steven Fisher, Partner, **Global Financial Associates**, St. Petersburg, Fla., which has used AANN since its inception. "Even though the early year results were good, the last two to three years have just been phenomenal. AANN had more than 80 percent accuracy in predicting in rank order the different asset classes

and their potential for growth. That gets turned into the different investments I use and have had success with."

AANN can make periodic allocation changes over time, notes Michael Pesendorfer, President of **M3 Investment Services**, a Berkley, Mich.-based firm with about \$175 million in assets under management that has used the network for about 10 years. "Clients who aren't comfortable making day-to-day investment decisions basically choose or qualify for one of the five models," he says. "That's overlaid on the mutual fund group or portfolio that they use. Then the program chooses their allocation and then makes periodic allocation changes over time. So a client just goes ahead and makes their investment, and then we let AANN do its job."

M3 Investment Services has also seen AANN's recommendations improve over the years, according to Pesendorfer. "The Legend Group does a very good job of being grounded in traditional methodology and developing this new technology," he says. "They continually condense massive amounts of data to paint a picture of what's going on. Things are moving so fast now that for an individual to keep the pulse of all the economic indicators out there and have an idea of what the climate looks like on daily basis – I don't know how that's possible anymore. AANN's ability to do that and paint a picture of where we are and where the various sectors are continues to get better. Increasingly, more of our clients are embracing the technology."

"Artificial intelligence has an advantage because it's not linear. Most quantitative models deal in three dimensions at most, but financial markets operate in many more dimensions."

"The Asset Allocation Neural Network [AANN] had more than 80 percent accuracy in predicting the potential for growth of different asset classes."

INVESTMENT DECISION SUPPORT

“Markets move so fast now that it’s not possible for an individual to keep the pulse of all the economic indicators and know what the climate looks like on a daily basis.”

AANN forecasts look four months ahead, with a 74 percent accuracy rate that continues to climb.

By using AANN, M3 Investment Services saves time on handling its relationships with its clients because it allows those clients to manage their portfolios while taking into account their risk tolerance, explains Pesendorfer. This allows M3 more time to research investments for clients, he adds.

In May, third-party plan administration firm **CPI Qualified Plan Consultants Inc.**, of Great Bend, Kansas, which provides services for funds totaling about \$5.4 billion in assets, began offering AANN to clients by referring them to Legend Advisory Corp. “Clients can choose among a menu of mutual funds, or if they don’t understand the marketplace, don’t understand diversification or proper asset allocation and need help, they can plug AANN in,” says Jon Prescott, Chief Marketing Officer at CPI. “If clients don’t have time to research and keep track of account balances, Legend uses AANN to professionally manage assets in a retirement plan.”

CPI client funds can enter different risk and reward tolerances of individual shareholders, explains Prescott. “Based on a questionnaire, Legend will take that participant or employee’s retirement plan account balance and plug it into the appropriate investment model,” he says. “Then Legend constantly watches it and manages all the underlying investments in that model.”

In developing AANN, Legend Advisory had to figure out what inputs to feed into its artificial intelligence. AANN favors long-term indicators such as global yield spreads, as well as equity risk premiums, bond market default premiums and money flows. In all, AANN analyzes 32 customized inputs, each compressed from huge volumes of financial data, to rank the relative strength of asset classes, stocks and debt securities.

“It’s a process of elimination,” says Mehrotra. “75 to 80 of those inputs are things you and I wouldn’t recognize

because they combine several building blocks or primary inputs.” Yet over-simplification should be avoided, according to Mehrotra. “If you just look at two variables, the past [performance] may look good, but when you try to predict the future, they may do a horrible job of giving you a decent return,” he says. “It’s O.K. to invest just a little in different asset classes, over the long term.”

AANN’s most recent recommendation was to decrease emerging markets weighting by more than 40 percent, from 14 percent to 8 percent, the largest such shift in a recommendation in four years. AANN has also recommended a shift from domestic small caps, pointing to projected weakness compared to the large-cap sector, and has reduced its recommended weighting in small-cap holdings by more than 30 percent.

“This is a pivotal time for small cap stocks,” says Mehrotra. “The rest of the globe is poised to outperform US markets. That and a possibility of a rise in interest rates may mean less liquidity for US companies. The easy credit of previous years may dissipate for smaller companies contributing to them potentially underperforming relative to large-cap stocks.”

AANN makes its determinations with artificial intelligence that, aside from thinking and learning like the human brain, and doing so at faster speed, can see beyond the dimensions possible for the brain or even traditional computer models. AANN forecasts look four months ahead, with a 74 percent accuracy rate that continues to climb.

AANN’s artificial intelligence, in the form of a neural network, is analogous to the function of human brain cells, or neurons, which connect into networks. Neural networks can sift data using interconnected processes, and like neurons, can learn the structure of data and detect patterns. “Artificial intelligence works great in the long term; it’s just more challenging,” says Legend’s Mehrotra. □