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An AI Analyst Made 30 Years of Stock Picks — and Blew Human Investors Away

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Alpha bot scoop: AI can squeeze extra earnings out of mountains of information that investors don't have time to analyze. | iStock/Torsten Asmus

The researchers' findings were so striking that they started hunting for mistakes. "We had this result a year ago," says Ed deHaan, a professor of accounting at Stanford Graduate School of Business. "And we spent the past 12 months scouring every inch of the data and of the model trying to find where we'd done something wrong."

DeHaan and his colleagues — Suzie Noh, an assistant professor of accounting at Stanford GSB, PhD student Chanseok Lee, and Miao Liu of Boston College — had created an "AI analyst" to study how much an AI bot, using nothing but public information, was able to improve on the performance of mutual fund managers. They were skeptical of the numbers they kept coming up with. But they could find no problems with their analysis.

"It was stunning," deHaan says. Between 1990 and 2020, fund managers had generated \$2.8 million of alpha, or benchmark-adjusted returns, every quarter. When the researchers' AI analyst readjusted the human managers' portfolios, it generated \$17.1 million per quarter on top of the actual returns. In short, deHaan says, "AI beat 93% of managers over a 30-year period by an average of 600%."

When deHaan presented his team's results to faculty and students last year, one of his colleagues asked, "Why don't you go start a hedge fund?"

Looking for Missed Opportunities

Though the model took a year to construct, the AI analyst developed its stock-picking acumen over several hours or, at most, days of training. The researchers started by feeding it market data from 1980 to 1990, which it used to correlate 170 variables with future stock performance. Some of these variables were straightforward, like Treasury rates and credit ratings. Others were more sophisticated, such as sentiment analyses of companies' earnings calls and regulatory filings, simulating how a fund manager might interpret corporate disclosures. The main criterion was that all the variables had to come from public sources that any fund manager would have had readily at hand. Through this process, the AI analyst developed a predictive model of how to invest to maximize returns.

The AI was then given portfolio data from roughly 3,300 diversified U.S. equity mutual funds that were actively managed between 1990 and 2020. Following its model, it tried to improve on the funds' actual returns by adjusting the fund manager's portfolio just once per quarter. "The AI couldn't just go in and invest in whatever it wanted to," deHaan says. "It tried to selectively tweak the portfolio around the edges using only public information."

"If every investor were using this tool, then much of the advantage would go

away.”

— Suzie Noh

It rebalanced the funds’ holdings every quarter while retaining their basic features such as risk levels and number of stocks. After the returns for each quarter’s adjusted portfolios were tallied, the portfolios reset to their original holdings at the time, and the AI went to work on the next quarter.

In making its decisions, the AI followed a basic series of steps. Drawing on the trends it had observed, it sorted investment options into 10 buckets, based on their expected future performance. Then, where possible, it would swap out assets that were more likely to underperform for a similar asset that might do better. If any holdings were particularly bad, the AI would sell them and put the proceeds into an index fund.

While adhering to this process, the AI altered roughly half of its entire portfolio of funds every quarter and, in turn, increased returns sixfold over the 30-year market simulation.

The magnitude of these results is in no small part due to the fact that the experiment essentially traveled back in time, dropped an AI analyst on a single team, and so gave that team a huge advantage. That doesn’t mean that the AI analyst could repeat its success in the current market, especially as more investors adopt similar tools. “If every investor were using this tool, then much of the

advantage would go away,” Noh says.

Meet the New Quants

DeHaan and his colleagues also found that the AI analyst was, in a way, not doing anything particularly unusual. When they started the project, the researchers and many people they talked with assumed that the AI would lean on a set of relatively sophisticated variables to make its investment decisions. In fact, it mostly used simple variables, like firm size and dollar trading volume. But it used a complex set of AI techniques to squeeze the most predictive value from this simple data.

From a scholarly perspective, this hits on what the researchers were initially trying to understand: How much money is left on the table by investors who do not exploit public information to its full potential? Any investment firm in the pre-AI era could have done this work by hiring enough quants. But it is *costly* to squeeze extra earnings out of mountains of public information, so companies don't bother.

“There are processing frictions,” deHaan says. “It turns out this information is expensive to know, even when datasets themselves are freely available.” He and his colleagues believe this is the first study to quantify these information costs in realistic conditions.

The unexpected success of the AI analyst also raises questions about the evolving relationship between AI and investors. This was underscored by a test in

which the researchers let their AI analyst craft and manage its own investment portfolio with minimal constraints. The AI performed just as well in this scenario as it did when working from portfolios that had been put together by people.

What all this means for professional investors is not clear. Its performance suggests that firms are likely to automate the grunt work of data collection, if they haven't already. "It's the same story we see with AI in every space," deHaan says. "The technology raises serious questions about the role of human workers when many of these tasks that are not just routine, but actually quite complicated, are being automated."

This doesn't necessarily mean that funds are about to hand over their portfolios to AI traders. "While this is speculation, I would think there will always be a role for clever humans who can guide the process and think in broad ways about strategies that haven't yet been thought of," deHaan says.

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