By Ainsley To

FACING THE UNKNOWN

Algorithms versus human judgment – whom do we trust?

Studies have shown that computers are more efficient and more often correct than humans, yet we still prefer to have a person doing the work. This could pose a problem as asset managers increasingly incorporate computer algorithms into their strategies.

"big data is like teenage sex: everyone talks about it, nobody really knows how to do it, everyone thinks everyone else is doing it, so everyone claims they are doing it." – Dan Ariely

It has been known for some time that in many environments, simple algorithms (on a far smaller scale than in AlphaGo) can be adequate substitutes for, and in some cases outperform, human decision-making. A 2000 meta-analysis by William Grove *et al* titled *Clinical versus Mechanical Prediction: A Meta-Analysis* highlighted 136 studies across a diverse number of fields (including medical diagnosis, academic performance, and parole success rates amongst others) where there was evidence that a systematic decision-making process can perform the same tasks more accurately by avoiding some of the behavioural pitfalls in human judgment.

A further observation was that the only time that humans performed better was in cases where they had better information than the models. With the deluge of data now available, the human advantage of having better information has been inverted, and we are seeing an increased reliance on the tools we build to interpret and act on new information. In asset management, this has manifested itself in a more prominent distinction between discretionary and systematic strategies.

The problem is that the decision of choosing between a human or an algorithmic strategy has been shown to be biased in its own right. In their appropriately titled 2014 paper *Algorithm Aversion: People Erroneously avoid Algorithms after seeing Them Err,* Berkeley Dietvorst *et al* looked at the decision-making of a number of subjects who were given a choice between relying on a human forecaster or an evidence-based statistical algorithm. There were many facets to the study, with a key finding being that the subjects showed a bias towards human forecasts even when given evidence beforehand that the algorithm did better.

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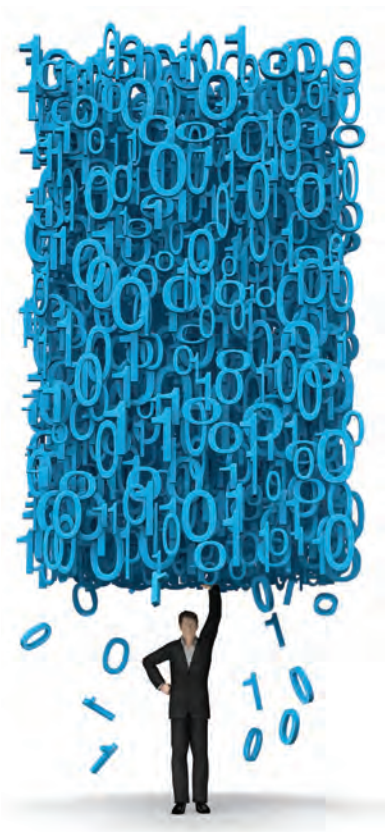

As data analysis is increasingly systematised to accommodate larger datasets, algorithm aversion may pose a number of future problems as well as exacerbating existing difficulties for investors.

Short-termism

A particular quirk of the results in Dietvorst's article is that the subjects' reactions to algorithmic errors were much more unforgiving than when their human counterparts made errors. People are more likely to abandon an algorithm than a person for making the same mistake.

Many of us who have used a GPS system when driving can relate to this – if you run into traffic on the way to work and you decide to take an alternate route but the journey ends up being much longer than if you hadn't, it is highly unlikely you would never again trust your own judgment in a similar situation. But if your traffic-sensitive GPS was the one to suggest an alternative route that ends up taking you longer, you're much more likely to lose confidence in the system going forward.

Performance-chasing and investor short-termism have long been an issue for the industry. As investment strategies become increasingly systematic, the lack of patience regarding algorithms could potentially make the problem worse. All strategies, whether systematic or discretionary, go through periods of underperformance. The challenge is ensuring that the benefits of using algorithms in investing (such as avoiding behavioural biases at the portfolio level) are not offset by bad behaviour at the investor level as markets become more data driven.

Transparency

People are even less likely to use algorithms if transparency makes it obvious that the algorithm will make errors, despite the absolute results being better than a human alternative. This creates a dilemma for intermediaries who use systematic strategies as they may present a

situation where full transparency may not be in clients' best interest if their bias might lead them to worse potential outcomes.

In a 2006 article titled *Do Patients trust Computers?* Marianne Promberger and Jonathan Baron found that patients are less willing to follow a recommendation when they were told it was from an algorithm than when they were told the same recommendation from a physician. They note that this can be partly attributed to an enhanced feeling of responsibility on the part of the subject – they feel they have delegated responsibility when a physician is involved but are still responsible if the recommendation was from a computer.

In his study *Adding your Two Cents May Cost a lot over the Long Term*, Joel Greenblatt of Gotham Capital fame found a great example of this in 2012. Greenblatt's "magic formula" for screening stocks [a combination of enterprise value/earnings before interest and tax (EV/EBIT) and operating return on invested capital (EBIT/IC)] became so popular that he opened his brokerage firm, Formula Investing, in 2009 on the back of client demand.

He gave clients access to his quantitative screening tool utilising his formula but he also gave them two options for using it – they could either follow the algorithm or be allowed to overlay their own discretion on which of the stocks in the screening they wanted to include or exclude.

After two years there were marked differences in performance for the two groups – while his full strategy beat the S&P500 by over 20%, clients who used his formula but combined it with their own judgment returned less than the index. These are examples of how transparency can also cause problems when they run into the common human trait of overconfidence. When faced with an imperfect algorithm that has a known error rate versus our own unknown human error rate, there is a tendency for us to be overconfident in our ability to do better.

Investment dogma

Another subtle problem posed by algorithm aversion is that the use of algorithms is often at the heart of controlled experiments in finance literature. Providing an objective test for the validity of an investment strategy by definition requires that you control for other variables, including discretionary judgment.

For Fama&French to document the long-term evidence that value investing is a profitable strategy, they had to use an objective measure of value (book-to-market in this instance) and implement systematic long/short equity portfolios to control for company size. A disdain of algorithms could lead to a disdain of objective evidence, without which your body of knowledge cannot progress beyond your own blind faith.

Joel Greenblatt
Founder of Gotham Capital

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Steve Jobs
Late co-founder, chairman and CEO of Apple

Demographics might perhaps play a role in this instance. It is plausible that "digital aliens" who are less comfortable with technology are more likely to suffer from availability bias when faced with a choice between quantitative long-term evidence and qualitative human judgment ("Well actually, I knew a guy who got rich day trading leveraged oil ETFs."). Perhaps until more "digital natives" occupy the investment decision-making process, there will be a persistent overreliance on the most opaque "black box" in investing – the human brain.

As James Grant of *Grant's Interest Rate Observer* once said: "Progress in science is cumulative; we stand on the shoulders of giants. But progress in finance is cyclical; in money and banking, especially, we seem to keep making the same mistakes."

Conclusion

Steve Jobs often quoted a study by S.S. Wilson titled *Bicycle Technology* from the March 1973 issue of *Scientific American*, comparing the efficiency of locomotion for various species on the planet. In the natural world they found that the condor was the most efficient animal in terms of the amount of energy required to travel a kilometre.

Yet the species that had come to dominate the planet, the modern human, was far less efficient than a number of other animals. However, when including artificial systems, top of the list in terms of efficiency was a man on a bicycle – better than the condor and five times more efficient than the human alone.

The brilliance of our species is not in our natural capabilities but in our ability to design tools as extensions of ourselves to adapt to the challenges we face. The computer is the bicycle for the mind. And those on foot may well find that in clinging to their tree of experience, they will miss the forest of knowledge. ■

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