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Markets Insight

Don't believe the hype about AI and fund management

Machine learning can generate marginal improvements but nothing truly transformational

EWAN KIRK

Hardly a day goes by without investors being told that artificial intelligence will revolutionise investment management. After all, AI is being hailed as a way to enhance image recognition, healthcare, movie recommendations, fake news and even the humble toothbrush. Surely it is only a matter of time before AI allows investors to sit at home getting rich, while watching movies with sparkling teeth?

Despite that persistent hype, reality is different. And the best way to distinguish the two is to consider what AI actually is. I find it useful to take any statement using the phrase, and then substitute the word "statistics". "The UK government vows to revolutionise the NHS with artificial intelligence," sounds somewhat less transformative when one says: "The UK government vows to revolutionise the NHS with statistics." Buying a "statistics-enabled" toothbrush also sounds more prosaic.

So how can we expect AI to help the investment process? The caricature is that one takes a bunch of data (preferably newfangled "alternative" data), throws it at some sort of "neural net", and out pops a vaguely defined financial goldmine. This misconception drives serious statisticians crazy.

First of all, machine learning requires a clear goal. That was what Google's legendary AlphaGo programme had when in 2016 it finally beat a human champion at the board game Go. But what is the goal of finance and investment? Higher returns over time? A twotimes levered position in the equities markets will give you two-times the return. Is it higher risk-adjusted returns? Adding some diversifying assets like bonds to your portfolio will give you that.

My personal story that illustrates the pitfalls of AI came in 2010 when I became interested in genetic algorithms, which use the power of selection and breeding to "evolve". I wrote a library of functions to evolve trading systems and allowed hundreds of thousands of artificial traders to breed. Eventually I had a huge population of artificial traders who were doing what many quantitative funds have been doing for decades — which was precisely not what I wanted.

Consequently, we have to tell the AI system something like: "Do not find me the returns that everybody knows about; just the subtle unknown ones." But this is hard to specify. Even if one can accurately specify the desired returns, it leads to a second problem: If the effect is subtle, it is likely to be small or short-lived, and thus hard to exploit at scale. Across the vast global investment industry, only a tiny proportion of funds will therefore ever likely benefit.

A third problem is that an AI system learns from the past. In this respect it is no different from any other systematic or discretionary investment process. But the fundamental problem of finance is that the past is not a good guide to the future. To use a statistical term, finance is not "stationary". In most AI domains like movie recommendation and toothbrushing, the "target" is stationary and the environment does not change much (unless you have had major dental work).

This is fundamentally not true in finance. There is a trade-off between reacting quickly to shifts in market dynamics, and believing that old patterns will reassert themselves. While one may wish an AI system to respond rapidly to events, this effectively means that it has to build a model on a very short history, which reduces the amount of data that the system can learn from. Tough choices have to be made.

And finally, financial data is very messy. Although it is not entirely random, the signal-tonoise ratio is certainly low. In fields where AI has been successful, this is typically not the case. AlphaGo, for example, knew exactly where the pieces on the board were. Nobody chooses 19 random movies for every one they like, and then expects Netflix to come up with good suggestions. It is possible to use sophisticated techniques to reduce the effect of randomness in finance, but it makes it challenging to apply machine learning.

It is not all doom and gloom. While it is unlikely that AI will create new scalable sources of returns, it is proving useful in more mundane tasks. AI is very good at cleaning data and great at detecting interesting features in gigantic datasets, for example. One technique that has gained traction is to use the same AI algorithms used in computer games to create realistic Non-Player Characters, like the monsters that try to kill you. These algorithms can approximate how a human trader would act in particular circumstances (without killing you, of course).

Once we are through the trough of disillusionment, investment managers will find many places where AI can generate marginal improvements. But they will probably still be cleaning their teeth with an old-fashioned brush.

The writer is President of GAM Systematic and former founder of Cantab Capital Partners.