Quoniam

Machine Learning:
A powerful tool for asset managers

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Artificial intelligence is seen as a major investment opportunity in 2023, but it's also a technology that investors can use in their investment process. Machine learning is one form of AI that we've been using at Quoniam for a long time. Here we speak to Dr Maximilian Stroh, CFA, Head of Research at Quoniam, about what machine learning is, its benefits and how we use it at Quoniam.

What is machine learning?

Machine learning is a method of programming computers using data. Rather than being programmed by a human, the computer looks at the data and finds patterns within it, helping improve its ability to perform a task based on experience.
Machine learning is the subset of artificial intelligence that we typically work most with – all of our models learn automatically from past patterns observed in the markets. An example is our corporate bond value model, which learns from data such as the implied volatility of related options to estimate the risk of a bond.

How can machine learning be used in investment processes?

It has a variety of uses. It can be used to predict equity returns, to model liquidity, to determine sentiment about a company from a news article, or to predict transaction costs. We can also use it to design and improve investment processes themselves. For example, we might want to find out if a new dataset could add value to data we already have. We could do that manually, but if you're trying out lots of things on a wide range of variables it's much quicker to use machine learning to find non-obvious patterns within the data.

Does machine learning lend itself more to use in quantitative than fundamental processes?

I would say in general yes, but it has its place in both areas. Machine learning is part of many quantitative investment processes, including Quoniam's, and we've actually been using very simple forms of machine learning since the company was founded.
These techniques aren't as important in a fundamental investment process, as their impact on investment results tends to be more indirect. However, they can still be very useful there. For example, fundamental portfolio managers could use a news sentiment score derived from a machine learning model to improve their timing decisions.
It's important to note that the output of models applying these techniques is often provided out-of-the-box by specialist data vendors. Quantitative investors are typically better placed to assess the reliability of this data. At the same time, it's also important to have humans in the loop to decide if they trust the findings of the machine learning model from a fundamental perspective.

What are the pitfalls to avoid in applying these techniques?

There are quite a few. One is overfitting, which is when you develop a model that finds relationships in the data that you train it on very well, but when you actually apply it in the real world you find it has little predictive power. Another is poor data quality, which can lead, for example, to biases in the model. What's more, large amounts of data are needed for a model to recognise reliable patterns in all the noise.
A big issue is that financial markets are always evolving. New technologies and information sources emerge and the first movers adapt and trade based on them, but as more people do so the prices are no longer what they used to be. And this is only one reason, why the relationship between information and future market behaviour can change from what the model has learned in the past.
It's also important to remember that the financial markets are inherently unpredictable, so no technology can guarantee consistent outperformance.

What kind of technological expertise and infrastructure do you need to use machine learning successfully?

In terms of infrastructure, you need access to a powerful cloud-based research platform because you might be working with terabytes of data and need the equivalent of hundreds of computers to run the models. However, when the research is done, you don't necessarily need so much – in many cases a powerful computer is enough.
It's a good idea to work with a cloud provider – you can scale up and down massively as needed. While there are a couple of ready-made research cloud solutions available from different vendors, none provided even close to the flexibility that we require. For example, we are a pioneer in credit factor investing, and the vendor capabilities for quant research on corporate bonds is not sufficient for our needs, compared to equities. The challenge was to create a platform that really handles equity and corporate bond data in a unified way for all of our strategies. In the end we built our own platform on Microsoft Azure.
In terms of expertise, you need a strong understanding of statistical modelling and algorithms, and you need good programmers in your team – at Quoniam we use Python. But you also need some fundamental beliefs and understanding of how the capital markets

work so you know what kind of relationships are plausible. It is not a promising strategy to just throw any data that you can find into an ML algorithm and hope for the best.
Another aspect is whether an investment strategy is practical. Not everything that you are able to predict can be turned into a profit. For example, we've seen pure machine learning experts launch funds based on the latest techniques and with excellent backtest results, but they didn't anticipate the market frictions that would arise when implementing their strategies, or all the costs that would be involved.

How long has Quoniam been applying these techniques?

We've been using a simple form of machine learning since our inception in 1999 to help us learn patterns in the markets, such as how much value a factor adds. This has led to excellent investment results. We've been using more complex forms in our equity process since 2018, and in 2022 we launched an investment strategy based on macro sentiment derived from news articles.
We also use machine learning in the research process to model transaction costs and liquidity to ensure we create models that are investable. More recently, we have started using advanced machine learning methods to help us quickly identify the exposure of individual companies to emerging crises. Outside of the investment area, we use LLMs (large language models) to help us write code more efficiently.

Is the use of machine learning likely to have a major impact on investment returns?

The growth of big data (unstructured, semi-structured and structured data) and the ability to derive insights from this data using machine learning in its various forms represents a new era in investing. Investment returns are driven by millions of global market participants forming their views based on the information available. As touched upon above, as AI methods such as machine learning make more information available faster, market efficiency will continue to increase and investing should become even more competitive.
So whatever type of investor you are – short term or long term, fundamental or quant – you will want to understand how new forms of information will affect your portfolio and have a plan to stay ahead of the curve in the context of your investment approach.

What are your future plans with respect to machine learning?

We're constantly researching new ideas to help us predict security returns. For example, we've investigated using machine learning to make predictions based on company filings and corporate bond documentation. Lately, we've created a prototype of a machine learning research assistant to help us find relevant information in research papers. Tools like this could make our research workflows more efficient.

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