M&G Insights

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Using artificial intelligence in global stock selection

The field of science and technology has made significant advances over recent years, revolutionising the way in which we interact with each other and the world around us. More and more, diverse industries are taking advantage of the technological developments within their respective fields to improve efficiencies and maximise output. At M&G Investments, we have put considerable resources behind developing our own proprietary machine-learning processes over the past decade, now using this to leverage off the latest technological advances and to enhance our investment processes. This is particularly valuable when it comes to the thousands of investment decisions to be made across global assets.

While this may seem like a rather straightforward concept to implement, it's worth noting that the investment process in itself is a complex one that requires a significant amount of human involvement. So, rather than outsourcing the entire investment process to an automated system, we use artificial intelligence to supplement and enhance our investment process, with human judgment serving as a key input and the final overlay.

What is machine learning and how do we use it?

At its core, machine learning consists of a series of algorithms (or rules) that are designed to analyse very specific sets of data.

At M&G Investments, these data sets are determined by a team of analysts who are responsible for examining a broad range of parameters and assessing if they have any statistical value in predicting future share price movements. If they do, these parameters are then thoroughly tested and vetted before being included in the overall data set.

The more statistically relevant data or inputs that the algorithms can analyse, the more precise the outputs or predictions become, effectively “learning and becoming smarter” over time. Our team of analysts therefore continuously work on finding new parameters to include in the overall data set.

One of the benefits of this approach is the ability to use computers to process large amounts of data at exceptionally fast speeds. This is especially handy when you need to filter through hundreds of parameters that are applicable to thousands of stocks across different sectors and regions to identify those that meet a certain set of criteria.

By turning those criteria into a series of algorithms, machine learning is able to assist us with filtering out the stocks that we would typically prefer to avoid, while at the same time identify those that should be worth considering.

This typically occurs over two stages:

Stage 1: Training the models

The data sets that we use within our machine learning models encompass various financial data, which can be broadly grouped into three categories:

- Valuation data points – this includes stock-specific information such as price-to-earnings ratios, price-to-book ratios, and dividend yields, as well as discounted cash-flow

valuations. All of these are data points that a portfolio manager would normally assess when analysing stocks.

- Technical data points – such as price trends, traded volume and relative strength indices (a momentum indicator that evaluates overbought/oversold conditions).
- Fundamental data points – which includes information that would typically be used by portfolio managers as part of a fundamental analysis, for example: revenue growth, debt-to-capital ratios, return on capital and cash-flow conversions.

Each of these parameters are analysed by our team to assess if they have any historical statistical relevance in assisting in the prediction of outperforming shares. Once appropriate parameters have been identified and vetted by the portfolio management team, the data points for each of these parameters are gathered on a weekly basis and inputted into our proprietary database. In total our database contains over a billion data points that goes back roughly 25 years and is growing every day.

Once the data has been gathered, we apply machine learning to train the models to identify sets of algorithms that can assist us in identifying companies that are most likely to outperform the equity market. At this point, the data includes the outcome of the desired parameter (e.g. subsequent share price movements) for which the algorithms are optimised. This stage of the process is incredibly time-intensive, taking weeks (sometimes months) to train a single model, keeping in mind that we train multiple models simultaneously.

Stage 2: Using models to generate predictions

Once these models have been trained, the next stage is to deploy them in a live environment where all the companies within our system are run through a series of models to generate an "alpha score". At this point, we do not know what the future share price movements might be, which is exactly what these models have been optimised for.

The "alpha score" is effectively an indicator of how likely a particular share is to outperform the market benchmark. The highest scoring companies then form the starting point of the stock-selection process. This is where human judgement once again plays a crucial role in the process. A team of analysts use fundamental expertise to

further analyse the stocks generated on the “buy list” and identify which companies we’ll ultimately invest in.

The next part of the process is portfolio construction. Here our tried and tested investment philosophy comes to the fore again. We put together a portfolio of our best investment ideas from the abovementioned process while also controlling risk (e.g. by managing country, sector and currency exposure). The aim is to protect the portfolio against macro factors that could, for example, impact specific countries or sectors. While at the same time, trying to deliver outperformance within each from stock specific factors.

How we use machine learning to improve our portfolios

Understandably, machine learning is not as applicable when analysing stocks across relatively small and very concentrated equity markets such as the JSE, which consists of roughly 400 companies of which about only 150 are sufficiently liquid investable shares.

However, where the universe of investable shares is vast, such as the MSCI All Countries World Index which considers more than 8,500 companies for inclusion, incorporating machine learning into the investment process allows us to analyse significantly more stocks at a much more detailed level than a typical team of analysts would be able to cover.

Given that the vast amounts of data being gathered is directly comparable across all the stocks being analysed, it gives us a significant advantage over traditional methods. Ultimately, machine learning significantly aids in the augmentation of the stock analysis component of our investment process.

In February 2018, M&G Investments in London began incorporating machine learning into the M&G Global Equity Fund. Since then, the portion of the fund that utilises the AI component has steadily increased over time, largely on the back of the superior returns it generated particularly during the unprecedented coronavirus crisis.

Over the past five years and more, we have seen significant evidence to suggest that incorporating machine learning as part of our investment process has enhanced our ability to identify the most appropriate opportunities when constructing investment portfolios.

On the back of this and our own internal research processes, in June 2021 M&G Investments launched the M&G Global Property Fund, which invests in a diversified portfolio of global property securities through the use of a similar investment process incorporating machine learning to that which we employed in the M&G Global Equity Fund.

Combining the best of human judgement and machine learning capabilities

While machine learning is central to these investment strategies, significant fundamental investment knowledge and expertise are still the cornerstone upon which our investment process is built. It is the vital component required in the selection of appropriate data inputs, the interpretation of the outputs, and the building of optimised portfolios that can deliver on their investment objectives.

Human involvement is essential to our investment process. The experienced portfolio managers responsible for managing these funds are supported by a large complement of equity analysts and portfolio managers, and hold the final decision as to which stocks are included and removed from the portfolios.

In conclusion, we are continuously looking for new ways to improve the management of our portfolios, and ultimately, the investment outcomes of our clients. This includes harnessing advancements in technology. The M&G Global Equity and Property Funds are two examples of how we have been able to do this, and we are confident that the combination of combining the science of “big data” with the art of human judgment will continue to prove beneficial to our clients.