Can the artificial intelligence (AI) revolution help pension schemes?

An overview of machine learning algorithms and some AI applications for the streamlining of scheme data preparation and pension risk transfer processes

Artificial intelligence (AI) is rapidly becoming a reality that can transform the way we work. Unsurprisingly, it could have multiple applications to the pensions and insurance universe; it has the potential to streamline operations, enhance member care, manage risk, and identify trends and opportunities. This should not translate into jobs being lost – a fear commonly expressed in the industry and the media. At Just, we believe that AI will boost our industry's productivity and allow more professionals to use their specialist knowledge in a more rewarding and fruitful way.

Machine learning (ML) has been around for decades, but recent advancements in technology have made it more accessible and usable. If we want to make the most of AI in the pensions industry, it is crucial to understand what ML is, how it works, and where it can be useful. Our aim here is to give pensions industry professionals a bird's eye view of the sorts of problems that can be tackled with these powerful computational tools, and some of the techniques' limitations they should be aware of.

Before machine learning became popular, computers were mostly programmed with rule-based algorithms to solve data classification and regression problems. But this approach requires a deep knowledge of the subject matter at hand and also can result in complex computer programmes that must account for the many nuances associated with the problems they try to solve.

Conventional ML algorithms learn 'models' of data where a certain label or valuable characteristic is known: think of recognising a flower species from its petal and stem size, or predicting the sale price of a house based on its characteristics. These 'trained' models can then make predictions about new data where the labels are not known in advance. As such, this approach has traditionally been applied to tasks where there is a large pre-existing set of example data to train the model. For this reason, most ML algorithms are specialised for one task, and must be re-trained for each new task.

More recently, a new family of 'generative' machine learning models, now commonly referred to as 'AI' models, have gained widespread public attention due to their capability to adapt easily to new, unseen tasks and generate new content. This generality is achieved by training the models on enormous sets of data from many domains. These models are more flexible, since they have many more trainable parameters: billions, relative to thousands in conventional ML.

The excitement around generative models stems from their versatility across various scenarios with minimal training examples. However, this may occasionally sacrifice output quality, requiring vigilance. Think of conventional ML as a reliable old machine, and generative AI as a keen yet novice assistant – the first excels in a single task, while the second has broader but shallower potential and so needs supervision.

At Just, we believe there is value in combining the benefits of both approaches, but in a responsible way.

Some AI pensions applications

There are a number of ways AI can be applied in the pensions arena.

One of the biggest immediate potential applications of AI for pension schemes is the enhanced ability to manage scheme data. This is especially true where data are needed by parties outside of pension schemes themselves, such as buy-in and buyout providers like the Just Group.

Third-party administrators are at the centre of an active de-risking market and are increasingly under pressure to quickly prepare and finalise scheme data for de-risking exercises.

Imagine the benefits of being able to instantly validate scheme data and get a quick report on the quality and completeness of the data, including the detection of potential errors. Envision being able to generate a detailed summary report about scheme data at will, or being able to automate the extraction and tabularisation of relevant parameter values for use in pricing models. This is an application that we have advanced at Just, with the result that

pre-pricing data preparation in minutes is close to becoming a reality. These ambitious goals can be achieved through a judicious use of a blend of rule-based algorithms, and conventional and generative machine learning models.

At Just, we think that a careful integration of AI in existing processes has the potential to transform a scheme's ability to cleanse pension scheme data – and thereby smooth the scheme journey to buyout – as well as removing some of the pressure from scheme administrators.

Another particularly significant discriminative AI application that can be implemented to safeguard our customers is fraud detection – particularly in regard to scamming attempts.

A common thread in the pensions press over the past few years has been the damaging outcomes from pension scams, whereby customers have been mis-advised to cash in valuable defined benefits in exchange for (sometimes) fraudulent investment schemes. These scams have left some individuals bereft of their retirement savings.

Both ML and AI could be put to good in this scenario. Using data on historic scams from The Pensions Regulator and the FCA alongside our in-house data, we could teach models to recognise the hallmarks of fraudulent activity, alerting members at the point of offers being made, or at the point where transfer requests are made to us by members. Automation of these alerts and subsequent actions would provide an invisible and 'hassle-free' layer of security for our members.

Generative AI excels at language understanding and text generation: think of 'Large Language Model' (LLM) applications such as ChatGPT and Microsoft Copilot. At Just, we are applying these models to improve customer literature, setting the perfect tone-of-voice when communicating with our customers. In the future, we aim to tailor our communications and tone to

individual customer's needs. Importantly, we want to continue to value the human element at the centre of our work: we use AI to empower our workforce, not replace it, to improve service, not to put a computer on the end of the phone.

We are also already applying LLMs to understand customer feedback, giving us the ability to have command over the quality of every dimension of our customer interactions. We are also using these models to process the large volumes of regulatory literature and internal guidelines to allow our workforce to work more efficiently for the customer. Furthermore, our software developers are using LLMs to more quickly develop new software to give our customers and clients a smoother and more enjoyable experience.

The reality of effective AI adoption is that the pensions landscape has a lot to gain from intelligent use of machine learning and artificial intelligence. It is not however without its challenges.

Challenges

For conventional ML to make accurate, it is crucial that the dataset used for training models meets certain quality and size standards. Specifically, considerable effort should be invested in ensuring that training data are unbiased, thereby preventing the generation of biased predictions. Also, the amount and breadth of data necessary to train a machine learning algorithm must be appropriate to the complexity of the problem being solved: More complex tasks require a higher quantity of more varied data. This necessarily also means that the model itself needs to be more flexible.

Another inevitable challenge arises from a rushed and imprudent use of LLMs. Although LLMs can produce highly convincing and accurate outputs, their outputs result from a sophisticated but ultimately approximate process, so they should always be verified and not taken as absolute truth. As a rule of

thumb, we should also always strive to be able to challenge first, and then explain the results obtained with AI, which in itself has value in terms of understanding the underlying data and processes better.

A further challenge, which is particularly true when using LLMs, is the ability of ensuring the secure handling of sensitive data. Currently, LLMs are typically offered as online services that operate on the provider's servers. To process the data, they must be transferred to these servers, which requires a secure approach and arrangements with the providers to guarantee the integrity of shared data. However, there is also the option to run open-source models, such as Meta's Llama, on private local servers, provided that the servers possess the necessary hardware capabilities to run the models.

We all recognise that we are amid a technological revolution fuelled by machine learning. The pensions industry should seize this opportunity to enhance and streamline its operations. In order to do so it is essential that high quality data are collected and stored in a convenient format for accessibility.

While machine learning, and in particular generative AI, can be a potent tool, it must be used with caution. There are no guarantees of accurate or consistent outputs, and it remains the human user's ultimate responsibility to verify the correctness of their output before using it. Perhaps most importantly, particularly for Just, although ML and AI can provide great value, we must not forget the value of human input and ingenuity over automated processes and decision-making.

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