



The rise of the machines? Machine learning and the audit

Machine learning (sometimes known as cognitive automation) and deep learning (or artificial intelligence) are two of the three forms of what is sometimes termed 'digital labour', with the third being robotic process automation (RPA).

On a spectrum of technological advancement, RPA is the most basic, machine learning is more sophisticated and deep learning is the most sophisticated. Machine learning is a key subset of artificial intelligence (AI), which originated with the idea that machines could be taught to learn in ways similar to how humans learn. While humans are just beginning to comprehend the dynamic capabilities of machine learning, the concept has been around for decades. The proliferation of data, primarily due to the rise of the internet and advances in computer processing speed and data storage, has now made machine learning a significant component of modern life. Common examples of machine learning can be found in e-mail spam filters and credit monitoring software, as well as the news feed and targeted advertising functions of technology companies such as Facebook and Google.¹

Whereas RPA uses technology to automate a process such as collecting data, machine learning uses algorithms to analyse data and make correlations and predictions (with human oversight). It is a more 'intelligent' form of technology than RPA.

Deep learning is where the technology appears truly intelligent as the machine may learn from its own experience, teach itself how to perform a task or analyse it, and so improve its own performance or effectiveness. It is as though the technology has a brain.

Machine learning and the audit

So, what are the implications of machine learning and deep learning for the audit?

Machine learning provides the potential for significant improvements in audit speed and quality, but also entails certain risks.

Along with RPA, machine learning is arguably the biggest modern technology already at play in the audit. On top of RPA processes, we are also applying machine-learning techniques where, through complex algorithms, the technology can scan information, model it against thousands of assumptions drawn from external scenarios and highlight risks and insights. This predictive analytics is a step towards deep learning where, in the future, the application will be able to 'think' for itself, learn from the results and run more scenarios and tests accordingly.

¹ Gabe Dickey, CPA, Sandra Blanke, PhD and Lloyd Seaton, PhD, CPA, CMA (June 2019). Machine Learning in Auditing: Current and Future Applications. Retrieved on 4 August 2021 from: [Machine Learning in Auditing](#)

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Machine learning is a vital step beyond robotics because the technology can capture data and identify correlations and patterns. It is also more intelligent than robotics — for example, it can locate specific line items by currency symbol and/or other keywords even if the placement varies from invoice to invoice — something robotics alone is not able to achieve. The technology can therefore be used to scan huge volumes of information. For example, on various valuation matters, we are developing applications to read bank loan agreements, leasing contracts, and other documents in order to find specific data and identify subjective areas.

Deep learning

Deep learning — full-fledged artificial intelligence where a machine continuously integrates the latest information, draws conclusions and absorbs the learnings to enhance its cognitive abilities — is seen as one of the greatest potential prizes of emerging technology.

There are issues that will need to be resolved. For example, it will be critical to show that the algorithms and technology behind deep learning are valid and robust to understand and document the outcomes derived and not to be led to false positives.

Regulators are actively working to keep pace with these emerging technologies. In the US, the American Institute of Certified Professional Accountants (AICPA) has recently published a guide to data analytics in the audit.

What is the impact on audit quality?

There is a clear consensus across audit professionals that the array of technologies being developed will help to increase audit quality. The ability to analyse 100% of datasets rather than sampling provides obvious benefits. Technology enables auditors to focus their efforts on the outliers and anomalies, devote greater time to areas of higher risk and have meaningful conversations — resulting in a better quality audit.

The power of robotics, machine learning, natural language processing (NLP) and, in time, deep learning will mean that an audit may become deeper and further reaching than ever before, based on increasingly granular and sophisticated analysis of data.

The fundamentals of an audit will not change as the need for human judgment and professional scepticism will always be necessary. The real use case for technology is that it will enable us to obtain — more easily, quickly, accurately, and extensively than ever before — the corroborating evidence that is needed in an audit.

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Key Contacts



Shaaheen Tar-Mahomed

Director

M: +27 60 674 9138

E: shaaheen.tar-mahomed@kpmg.co.za

www.kpmg.com

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