

MACHINE-LEARNING

# What if machines could teach themselves?

One of the big conundrums with AI is the paradox that it will help solve the skills shortage across many sectors but will require skilled operators to 'teach' the machines how to think

Davey Winder

**C**an you imagine a world without the kind of voice assistant technology provided by Amazon Alexa, Google Assistant, Siri on the iPhone or Cortana for Windows? Probably not, as we tend to take such technological leaps forward pretty much for granted.

But behind the scenes there's a whole new world of machine-learning that drives their collective ability to seemingly answer any question put to them. It's not so much knowing the answer that's the technological miracle – because, well, the internet – but rather that these virtual assistants are able to understand the question in the first place.

Machine-learning is, in the broadest possible terms, what you might expect in that computer algorithms can be trained to understand how to correctly respond to an input by way of a human telling it what that response should be. Over time the collective inputs and outputs enable the computer to learn, albeit within a relatively narrow and defined speciality, all thanks to the skilled operators that handle this education.

Which is where one of the biggest conundrums surrounding AI pops up: the paradox that it will solve the skills shortage across multiple industry sectors yet requires skilled operators (who are in very short supply themselves) in order to achieve it. But what if the machines could teach themselves?

When talking about the machines teaching themselves, this is what's known as unsupervised machine-learning. The simple definition of which is that the machine, or rather the algorithm running it, can be trained without the classification or labelling of data. In other words, the algorithm takes the input and determines the correct response itself, without the need for the output confirmation part of the learning equation.

But have we really reached that far in the development of thinking machines? Labhesh Patel, chief scientist of Jumio, answers with a qualified yes. Mr Patel, whose company uses machine-learning to deliver identity verification and authentication solutions, says that the best machine-learning models start with supervised training and once the AI system is regularly outputting correct results then unsupervised models become a viable proposition.

"Think about sites like Amazon or Netflix that offer recommendations," Mr Patel explains, "once the machine-learning models have been created, they will

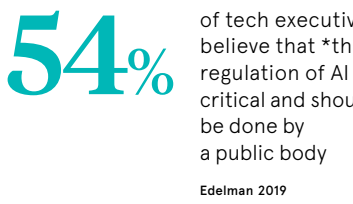
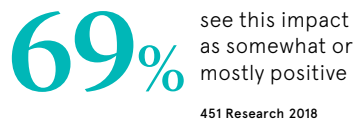
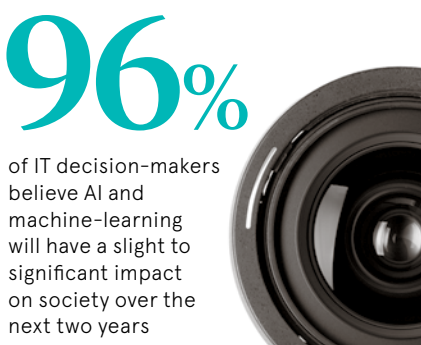
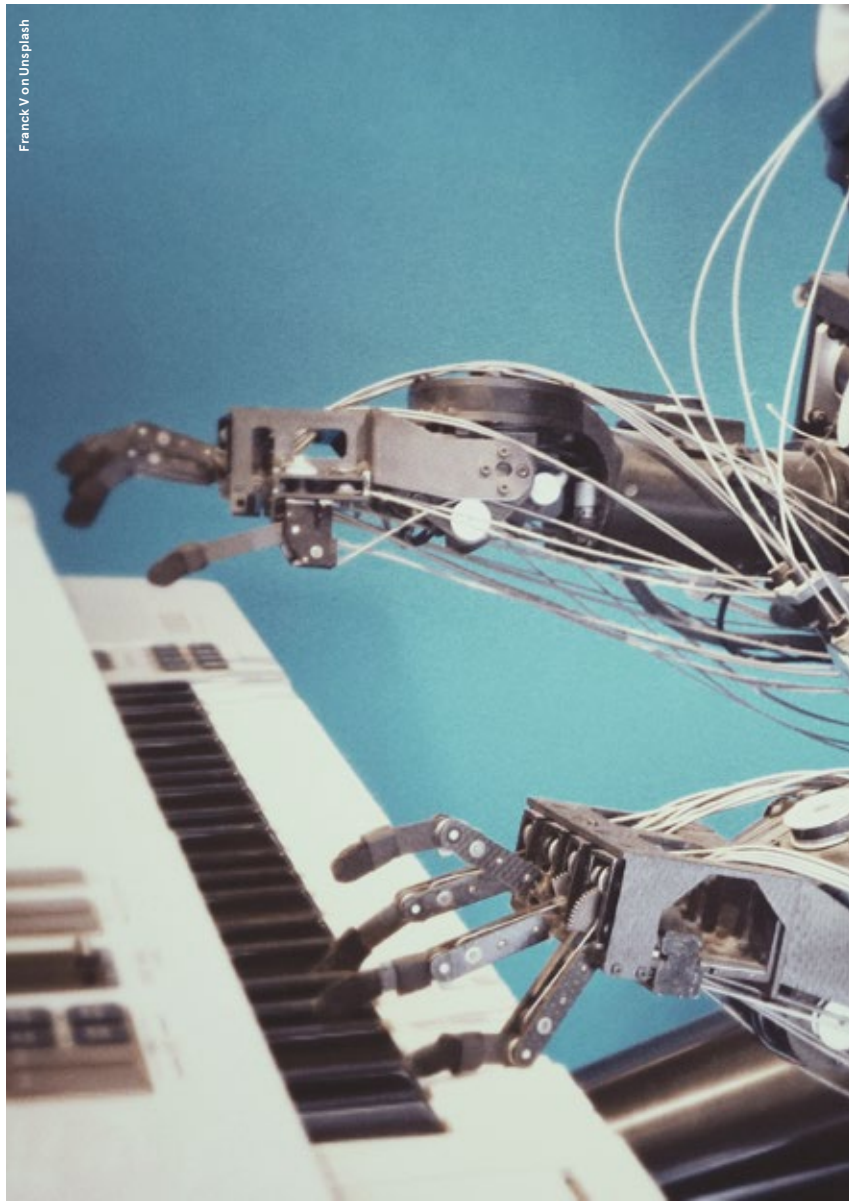
**“**We need to be thoughtful about how AI technology can be used to enable responsible innovation**”**

learn based on user behaviour. If a recommendation keeps getting clicks, those clicks will feed the intelligence of the algorithms and that recommendation will become more prominent."

Another example is language modelling, according to Dr Tom Ash, a machine-learning engineer with speech recognition company Speechmatics. Language modelling involves "learning about grammar and sentence structure from large bodies of text without any labelling of those words into different classes," he says. In other words, algorithms can be applied to identify patterns in random data without the need for human input.

"This perspective is hugely interesting as human beings live in a world full of patterns," says Antonio Espingardeiro, Institute of Electrical and Electronics Engineers member and an expert in the field of robotics and automation. "Humans tend to observe and generalise," Mr Espingardeiro says. "These algorithms apply formulas and present possible results without generalisation."

Such an ability comes to the fore in areas where there is either a lack of 'pre-



labelled' data or a requirement to minimise the bias that 'expert knowledge' inevitably brings with it. "Without target information to train on, the learning algorithm must learn from general patterns inherent within the data," says Chahmn An, principal software engineer for machine-learning at next-generation threat intelligence provider Webroot, who continues: "such as the shape of edges within images or syntax patterns within natural language."

Not everyone agrees, however, and some insist that it's a myth to suggest an AI can teach itself anything outside of the context of its learning environment, which means it is only as good as the combined forces of the human teacher and the data it is fed. And there is certainly an argument to be made that, currently at least, human oversight is required to ensure that machine-learning-driven decisions are transparent and trustworthy.

"An insurance AI let loose on unstructured driver data might decide blonde people are a higher risk of having accidents because they happened to be over-represented in the sample of risky drivers," argues Ben Taylor, chief executive at Rainbird, which helps deploy AI across multinational corporates. Mr Taylor points out that the insurance industry is not alone in having poor data hygiene, which could lead to unsupervised AIs making critical errors.

But what of that skills shortage paradox mentioned earlier; will unsupervised machine-learning help to break out of this seemingly unending contrary loop? Mastercard has been pioneering the use of AI that tests the algorithms used to detect fraud and anomalies in payments, and has had some success using AI that monitors other AI models through unsupervised learning techniques.

Ajay Bhalla, president for cyber and intelligence solutions at Mastercard, is certain that machine-learning will plug the skills gaps across a range of indus-

tries, at both the skilled and unskilled ends of the spectrum. "By supporting the performance of routine tasks, AI tackles 'thought labour' for high-value roles, freeing up experts to do the critical thinking machines simply can't do," he says.

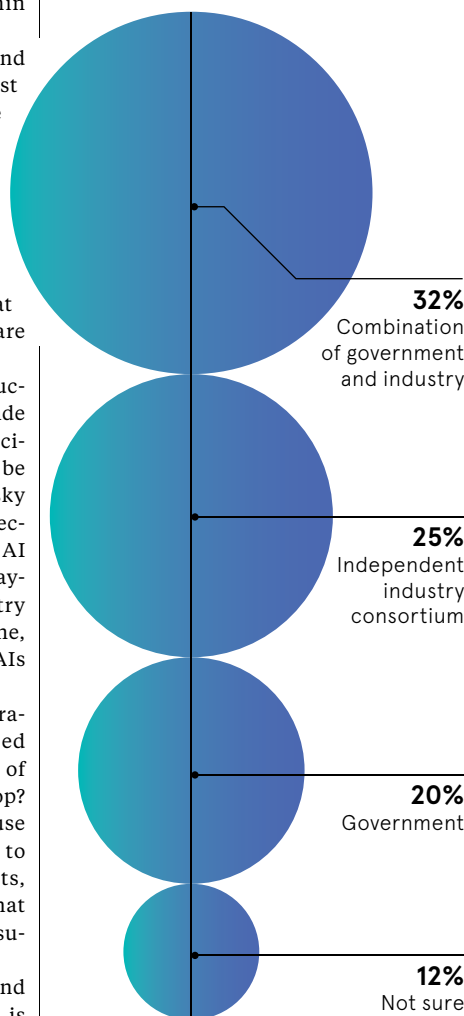
But that doesn't mean that unsupervised machine-learning is automatically a win-win. "We need to be thoughtful about how AI technology can be used to enable responsible innovation," Mr Bhalla says. "This will inevitably require greater collaboration and transparency as solutions advance, as well as attention to how data is handled and how we address issues such as unintended bias."

And while nobody is suggesting a Skynet scenario here – the fictional AI network that features as the main antagonist in the *Terminator* film franchise, for those who are not familiar – issues surrounding misuse of data and the potential for bias that could have negative consequences for customers and companies alike, cannot be ignored.

"The release of the EU's ethical guidelines for trustworthy AI is a step in the right direction," concludes Peter van der Putten, assistant professor of machine-learning and creative research at Leiden University and global director of AI with customer relationship software outfit Pegasystems. "But it will be up to the individual providers to comply and iron out any ethical issues with the AI they are using before it is fully implemented." ●

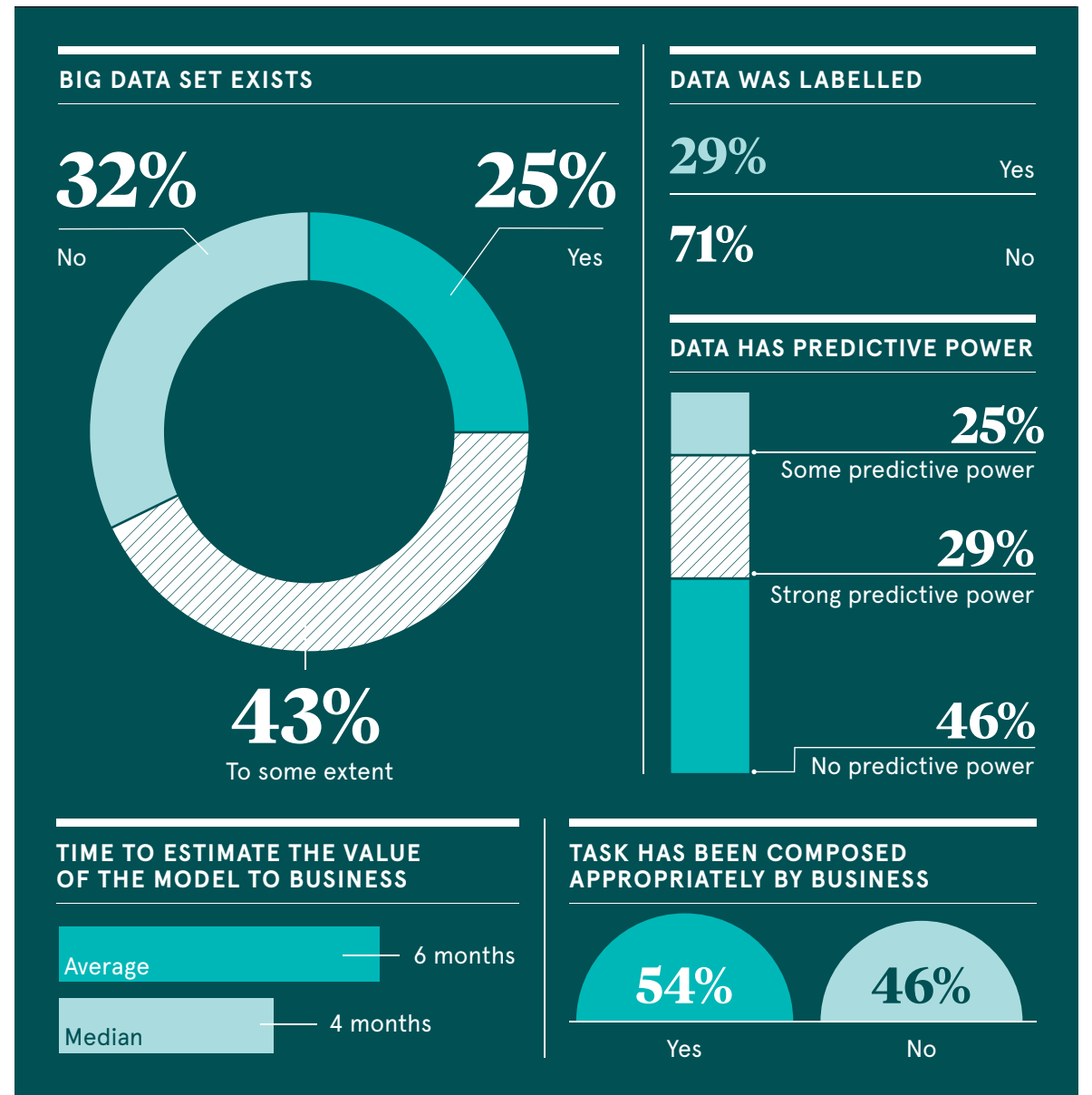
## WHO SHOULD REGULATE AI DEVELOPMENT?

Percentage of US and UK IT leaders who agree with the following



SnapLogic/Vanson Bourne 2019

Commercial feature



## Embracing the transformative power of artificial intelligence

The ability of artificial intelligence and machine-learning solutions to reshape entire companies and business models is now widely acknowledged

**T**hanks in part to growing computational power, firms are able to carry out trials with innovative tools backed by artificial intelligence (AI) and uncover exciting use-cases that were not achievable in the recent past.

"It's clear that AI will fundamentally change how human beings live. At the moment we are in an experimental period, when a lot of companies and leaders are testing AI to see its true value," says Alexey Tsyvunchyk, chief technology officer of InData Labs, a leading data science services provider. "Some of these projects will not survive, but the ones that do will have a substantial impact on virtually all industries."

According to research from Gartner, 85 per cent of the interactions customers have with businesses will be handled without any human element by 2020. This radical shift will reduce costs for companies and enable employees to undertake more complicated tasks that require human intelligence.

"Adopting AI and machine-learning (ML) will provide you with the tools to optimise costs by learning from previous business experience in an automated way. It's possible to create new models inside your company that learn from historical data and make accurate predictions on the future of the business," says Mr Tsyvunchyk.

There are literally hundreds upon hundreds of potential applications of AI tools that have the ability to upend traditional processes and business models. For example, InData Labs developed a natural language processing (NLP) solution for an international games developer that helped them quickly and accurately analyse customer feedback from YouTube and online forms, which was a major improvement on the previous manual processes.

The first step before a business moves forward with any type of AI initiative should be to define what the exact business problem is that AI is attempting to resolve.

"AI is not a magic solution that will fix all of your problems; it has to be targeted at specific challenges. It's best suited to the automation of routine activities or obtaining insights from a large volume of historical data, which is sometimes difficult for human beings to understand and process," says Mr Tsyvunchyk.

The conversation around AI and ML has already developed from its initial hype-based discussion into a search for how to uncover practical solutions. Yet not all businesses will be ideal candidates for advanced AI solutions as the data they hold may not be appropriate for these tools to be effective.

"We had a case where we were approached by a mobile fitness company to assist them in creating a personal assistant that would provide personalised recommendations to the user to help them lose weight. They did have a dataset, but they had not collected a user's height, making it impossible to compute BMI, which is the key indicator in this solution," says Mr Tsyvunchyk.

In some cases, the lack of certain data may make it impossible or extremely difficult to make an accurate prediction. It's vital that as much relevant data as possible is collected before implementing an AI solution, as the end-results of any data-driven tool will rely heavily on the data input.

As the rapid growth of challenger firms such as Uber illustrates, disruption can come to any industry and firms that don't implement AI solutions will be threatened by up-start competitors. The growing use of powerful AI tools in all manner of consumer applications, most notably by Netflix, Uber and Amazon, is increasing customer expectations and making it vital for all companies, no matter what industry they operate in, to embrace AI.

"Financial organisations, primary banks and debt collection organisations, will be able to predict their customers' behaviour more precisely and apply a more personalised approach to each customer. For example, contacting them with advice and checking the creditworthiness of customers," says Mr Tsyvunchyk.

**“**Artificial intelligence and machine-learning, in conjunction with big data processing technologies, uncover the possibility to personalise services for each individual user**”**

Most aspects of customer service will be impacted by AI and related technologies with the management of customer interactions being improved through automation. Chatbots and virtual assistants, backed by NLP, can provide around-the-clock support to consumers with relevant advice as well as tailored product recommendations.

Even traditional industries, such as the railway sector, can make use of sophisticated AI solutions. A train operating company approached InData Labs looking for help to improve the process customers have to go through to receive a refund after their train is cancelled.

"When there are multiple trains that had been cancelled, a lot of travellers would try to get the cost of their ticket reimbursed by sending a photo of the ticket to the train operator. Instead of wasting the time of staff by manually checking the ticket information, we recommended the client create a system that used computer vision, NLP, AI and robotic process automation to automate this process," says Mr Tsyvunchyk.



Alexey Tsyvunchyk  
Chief technology officer  
InData Labs

This example of the ability of AI-based solutions to transform conventional business processes and operations saw important ticket details, including the customer's name, destination and ticket number, extracted from the image and input into an internal system to reimburse automatically without human involvement.

"AI and ML, in conjunction with big data processing technologies, uncover the possibility to personalise services for each individual user. Businesses will be able to deliver the right message at the right time through the right channel by understanding customer needs and offering them the most appropriate products or services based on customer behaviour and historical data," says Mr Tsyvunchyk.

But there remains a lack of understanding among many firms around how to incorporate AI tools into their operations and ensure they get the most value from these burgeoning technologies.

Embarking on an AI project can signal the start of an exciting new stage of development for companies. But for these often complex and elaborate ventures to be successful, partnering with a skilled AI expert can be vitally important.

InData Labs has substantial experience as a data science services supplier and works with firms that want to implement practical AI solutions in their business. By exploring the exact business areas where AI and ML services can have the most positive impact, InData Labs can establish a reasonable explanation on why the company is either suitable or not for these innovative tools.

"From performing an exploratory data analysis to building machine-learning models and integrating them into the company pipeline, and setting up an internal data science team, we help companies at every step of the AI and ML journey," Mr Tsyvunchyk concludes.

For more information please visit [indatalabs.com](http://indatalabs.com)

