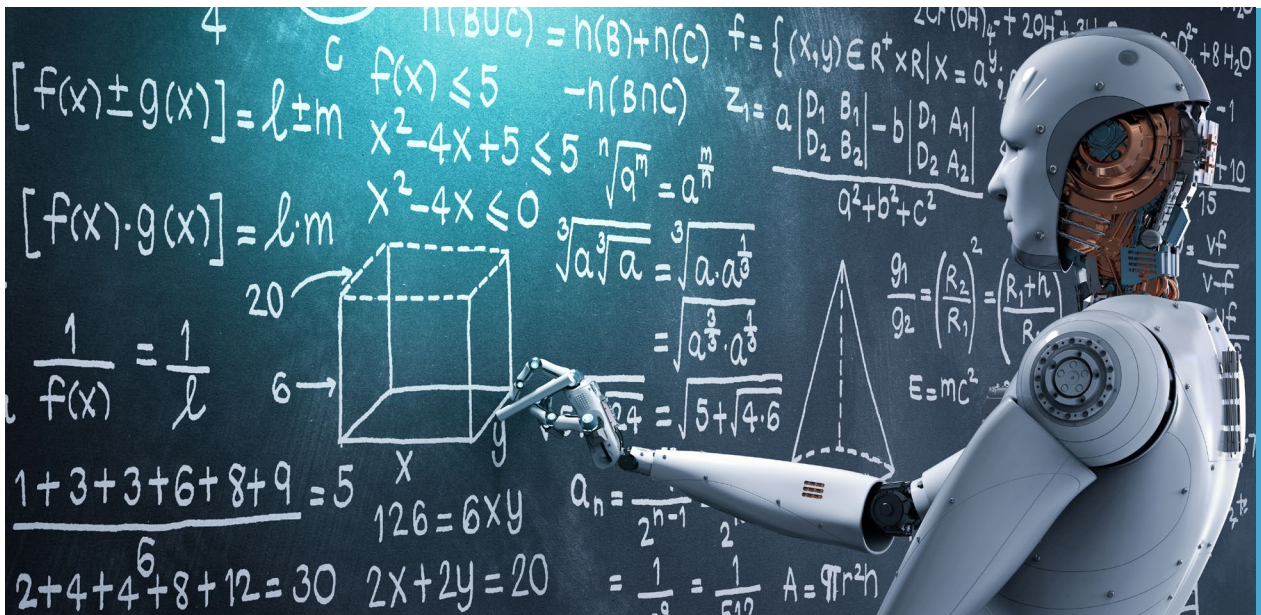# AI is learning. Are we?

As a field of study, AI has been around since 1956. In the last few years, important breakthroughs have been made in the ability of machines to perform tasks that typically require human-like understanding. However, there are many roadbloacks hindering AI from realizing its potential. One is the skilled AI experts necessary to expedite progress.

By Chris Pereira, Linda Xu

With the computing power of machines increasing exponentially and staggering amounts of data available, AI is on the brink of revolutionizing various industries and the way we live our lives.

Globally, the majority of firms believe that having an organizational model that supports AI-driven analytics is critical to breaking down the silos of customer knowledge that exist throughout organizations. The trend is clear: our world is becoming increasingly connected and intelligent.

Echoing that vision, the founder and CEO of Hang Ten Systems Vishal Sikka is looking forward to a future filled with AI applications, systems, and analytics. He expects that the current wave of AI will "produce a tremendous number of applications and have a huge impact." While

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> — Vishal Sikka, the founder and CEO of Hang Ten Systems

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he's certain that the current hype cycle will die and "make way for a more thoughtful, broader approach," he emphasizes that a rethinking of education is necessary to bridge the talent gap in AI, make AI applications available to the masses, and ensure that the development of the technology remains safe.

New advances in AI

The combination of multiple advances has led to a set of significant breakthroughs in AI. "Huawei and others are building their own AI processors and many startups are as well, and all this is becoming available in cloud platforms," says Sikka. "A lot of incremental advances are happening in the core software technologies that sit on top of this infrastructure, which are still in the early stages of maturity. And this will of course continue."

In basic sensory processing and perceptual tasks like image recognition, speech recognition, and language processing, AI already outperforms humans. Intelligent systems can now identify cancer cells from medical scans at a higher rate of accuracy than humans, and machines can translate language, identify images, and classify documents at rates and accuracies on par with humans.

Tractica forecasts that the revenue generated from the

direct and indirect application of AI software globally will grow from US$643.7 million in 2016 to US$36.8 billion by 2025, creating a CAGR of 56.8 percent. Underpinning this growth, Sikka adds, is "a dramatic improvement in computing power, and the availability of massive data sets."

If you look at identifying radiology scans or large-scale facial recognition, for example, these are all better than human capabilities already. Out of the top 10 use cases, 60 percent are related to big data and 40 percent are related to image or object recognition. The core strengths of AI capabilities right now are clearly focused in these areas.

"My sense is that there are going to be three different fronts of development," says Sikka. One such front is likely to be in building applications for these technologies, creating huge opportunities in bringing various applications in different domains to businesses and consumers. However, states Sikka, "We're still in very early days on this front. That is going to be one big thing that will happen in the next 5 to 10 years. We'll see applications in all kinds of areas, creating application-oriented breakthroughs," added Sikka.

Gearing up for AI

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Given all these advances, it almost seems like we should start becoming concerned about the future of work — should people worry about machines taking their jobs?

In fact, though, AI isn't anywhere close to being able to replace humans, Sikka explains, "We're not even close to the kind of intelligence that even children have. AI is getting really good at perceptual tasks, like recognizing images. But that ability is very superficial. The ability of AI, or a deep neural network, to distinguish a dog from a picture of a dog or from a metal dog, is very superficial.

It's simple classification."

The combination of the full stack is a powerful way to help enterprises embrace AI, but there's still much work to do. For example, while AI systems are doing incredible things, we're not quite sure how they're doing it. AI engineers aren't yet able to articulate the behavior and machines aren't truly reasoning or processing information like a human does.

Several key breakthroughs still need to happen before

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we get to Artificial General Intelligence whereby AI is able to perform tasks with human-level intelligence – if we ever achieve it. The road ahead is still long and hard.

However, as the underlying technology develops over the next few decades, further breakthroughs can and will be incorporated into AI solutions. Of course, some great applications are already possible across industries. The focus of the industry in the near future is about identifying these applications and building them up in a very robust and focused way so that enterprises can rely on and trust these applications.

Open-source AI

"When we build enterprise AI for enterprise applications, we have to keep the drawbacks in mind," said Sikka. "That's why I'm very excited that Huawei has unveiled its AI strategy, starting from the chip, all the way to the solutions and several layers in between. The native AI processor, the programming model, MindSpore framework, and developer platform."

Huawei recently rolled out a set of open-source AI development tools on its cloud service platform, aiming to help developers and engineers simplify the

AI workflow from training machine learning models to deployment on local devices. For example, Huawei's new ML framework, MindSpore provides device-edge-cloud training and inferencing based on a unified distributed architecture for machine learning, deep learning, and reinforcement learning. It also supports models trained on other frameworks.

The ability to deliver applications to enterprises using full-stack solutions like Huawei's is a direction of focus for many in the AI field. And while impressive things are happening in the field of AI, there are numerous bottlenecks still to overcome. "If you look at the way our brains are constructed, they're highly resilient. We're much more than fraud identification machines or obstacle detection and avoidance machines," says Sikka. "I can have this conversation with you while also driving a car and thinking about what I have to do next and whether I'm feeling thirsty or not, and so forth." To give machines these abilities will require certain breakthroughs that still haven't happened. Sikka believes that the state of AI today is such that there's a gold rush around a particular set of techniques. "We need to develop some of the more broad-based, more general techniques as well, which bring in reasoning, articulation, and other capabilities," he says.

> **" There's just a massive amount of hype, myth, and noise around AI. We need to broaden the base, to bring the awareness of AI and the awareness of technology to large numbers of people. This is a problem of scaling the educational infrastructure. "**

Education is lagging behind AI's development

The development of AI is asymmetric. A few companies have disproportionate access to data and to the AI experts, a point with which Sikka agrees, "There's just a massive amount of hype, myth, and noise around AI. We need to broaden the base, to bring the awareness of AI and the awareness of technology to large numbers of people. This is a problem of scaling the educational infrastructure."

According to Sikka, if we want to keep up with the rate machines are learning, we should too. "One critical aspect of AI is education. We all need to learn more about AI, given how important it is going to be in the times ahead," he says. "There are only approximately 300,000 machine learning engineers around the world — this number needs to be in the tens of millions in the next one or two decades." Equally, he believes that education is not only crucial for democratizing AI, but that the need for open collaboration and lifelong learning will be even more critical in the future. "The ability to build explainable systems, the ability to build safe AI, the ability to

build articulate AI, will require a lot of work from academia, from government, and policy setting," says Sikka. "We really need to place a tremendous emphasis on education, which again requires cross-boundary collaboration, across universities, across education institutions, throughout life, and throughout careers".

An exciting, intelligent future for AI

Speaking about the future of AI and what excites him, Sikka states that, "Looking further down the road, the ability to build more intelligence into systems, such as the ability to reason, the ability to articulate, to build systems…that's something I'm really excited about." Sikka explains that getting to this stage involves continuing to build tools and platforms.

These sentiments are echoed by many in the industry, who describe AI as the "general purpose technology" of the 21st century, like electricity and railways were during the industrial revolution.

Clearly we all have a lot more to learn about the coming era of AI — and education sits at the heart of continual progress. ▪▪▪