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Headline: Race with machines, not against them

ST-SMU Future of Work

Race with machines, not against them

In the first of a four-part series on the future of work, MIT research scientist Andrew McAfee explains how workers can race with smart machines.

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In a face-off two years ago, Enlitic, a deep-learning machine, was pitted against expert human diagnostic radiographers in diagnosing lung cancer.

Enlitic won. The machine, which was built to read X-rays and CT scans, was 50 per cent better at classifying malignant tumours and had a false-negative rate (where a cancer is missed) of zero, compared with 7 per cent for the humans.

Machines like Enlitic point to the fact that many jobs, including white-collar ones, are in danger of being taken over by robots and computers.

Quite simply, if a job is routine, it can be done by a machine, says Dr Andrew McAfee, principal research scientist at the Massachusetts Institute of Technology (MIT) Sloan School of Management and co-author of The Second Machine Age. His work explores how information technologies are transforming business and society.

A radiographer must match patterns, he says.

"But, at the end of the day, matching patterns is routine work and machines can do such tasks very well, much faster, and without getting tired," explains Dr McAfee.

Machines are quickly acquiring many skills which used to be the preserve of human beings – from understanding natural language to driving cars – he says.

"These machines are going to automate some people, perhaps many of them, out of their jobs."

Loan officers, for example, can be replaced by algorithms that identify safe borrowers. Stock and equity analysts will be competing with smart machines that can precisely analyse and predict the behaviour of investments. Robo-advisers are on the rise and starting to replace financial advisers and planners.

So are there any jobs that are safe? Jobs that require creative thinking – like writing, entrepreneurship or scientific discovery – may endure, Dr McAfee says. "There is no better time to be an entrepreneur with a great idea, because you can use technology to leverage your inventions," he says.

Another category of jobs that are safe are those that require social interaction. "I don't see nurses or kindergarten teachers being replaced by robots any time soon," he says.

He encourages workers to attain skills that are complementary to machines – as opposed to those that can be substituted by machines.

These would include skills like negotiation, expressing empathy, problem solving and, most of all, the ability to program computers.

He sounds like he is plugging the Singapore Government's SkillsFuture movement that encourages workers to acquire deep and relevant skills.

"Figure out where your passions are, what you're good at, and how you can race with machines instead of against them," he advises.

He calls himself a "tech optimist", but adds the qualifier, a "mindful optimist"."Imagine a world where the robots did all the hard and routine work. They tend the crops, sew the clothes, cook the food, drive the trucks, and work on all the assembly lines in all the world's factories.

"In this world, everything would be a lot cheaper because labour costs would drop to zero. In fact, there'd be a startling abundance of stuff. And people would be freed up to do things other than work," he says.

But governments need to overhaul education systems to help a nation's people to "race with machines", instead of against them.

Top on his to-do list for governments is education.

"The education system is in need of an overhaul. At the moment, the system is turning out the kind of workers we needed 50 years ago.

"We are training people to be good at things where machines are better, which is a very big mistake. No point focusing on the ability to memorise facts, the ability to do routine tasks, the ability to do simple maths – computers are better at all those things than we are," says Dr McAfee. "We need intellectual curiosity, problem solving, group work, creativity and self-direction – very, very different kinds of skills."

But he also admits that with rapid machine advances, it is hard to predict what skills are going to be valuable down the road.

"We need to learn how to educate and train people to be intellectually flexible, to be able to shift over time as requirements shift."

The second is infrastructure. He argues that world-class roads, airports and networks are investments in the future and the foundations of growth.

Next, countries need to develop an environment that is receptive to entrepreneurship.

"Entrepreneurship is a job-creation engine. Young businesses, especially fast-growing ones, are a prime source of new jobs," he says.

He is for liberalising immigration policies.

"Many of the world's most talented people come to America to build lives and careers, and there's clear evidence that immigrant-founded companies have been great job-creation engines."

The fifth thing is basic research.

"Companies tend to concentrate on applied research, so governments must support original early-stage research. Most of today's technological marvels, from the Internet to the smartphone, have a government programme behind them."

As technology marches on, the one option he will not countenance is to block the advent of smart machines so that jobs will not be displaced."We need to let technology race ahead because it's bringing all kinds of great things to us in our lives. Technological advances have bettered people's lives at all levels of the pyramid, in all regions of the world. We shouldn't lose sight of that."

He goes back again to the radiology example.

"If we have higher-quality, lower-cost medical diagnostics, that's completely a good thing for humanity, especially if we can take that technology and extend it downward to people who currently don't have great healthcare or don't have healthcare at all.

"It's not science fiction any more. For many medical conditions, you can diagnose them with a smartphone that's got a decent camera on it, maybe attach some kind of a chip to it, and then you have got absolute-best-in-the-world medical diagnoses available to people at the base of the pyramid.

"If that's not good news, I don't know what good news is."

He concedes, though, that automation and globalisation will lead to job losses and rising income inequality. The biggest winners will be those who create and own the new machines.

Those on the wrong side of the divide will find it difficult to gain access to the bounty created by technological progress.

He says: "We need to figure out how to deal with this. It will be one of the most important issues for governments to grapple with in the decades to come.

"One of the ways to address the issue is through a negative income tax that provides low-income workers with an earnings boost. This is worth considering.

"The solution can't be to hold back on technological progress."

Back to the diagnostic radiographers. "Imagine if we develop machines that are far more accurate and efficient at reading X-rays and scans. Would it be ethical to still use humans to do the job, just so that they have a job? I think it would be deeply unethical to let people continue to do that. This is health, people's lives are at stake."

The solution, of course, is to retrain and reskill radiographers to take on other jobs.

"We are heading into a world where there is more abundance, less scarcity, less toil and drudgery and poor health and suffering... If we can't reorganise, retool our societies so that everyone can have a fair share of this bounty, then, shame on us."

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If a job is routine, it can be done by a machine, says Dr McAfee, PHOTO: EVE PHOTOGRAPHY

BIO

Dr Andrew McAfee, a principal research scientist at Massachusetts Institute of Technology (MIT), studies how digital technologies are changing business, the economy and society.

His 2014 book on these topics, The Second Machine Age: Work, Progress, And Prosperity In A Time Of Brilliant Technologies (co-authored with Erik Brynjolfsson) was a New York Times bestseller and was shortlisted for the Financial Times/McKinsey business book of the year award.

He writes academic papers, a blog for the Financial Times, and articles for publications including Harvard Business Review, The Economist and The New York Times.

He has talked about his work on The Charlie Rose Show and 60 Minutes, at TED, Davos, the Aspen Ideas Festival, and in front of many other audiences.

He was educated at Harvard and MIT, where he is the co-founder of the institute's Initiative on the Digital Economy.

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CALL TO OVERHAUL EDUCATION

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