



AMID ALL THE TALK OF SUPER-INTELLIGENT COMPUTERS AND MASSIVE JOB LOSSES, ARE WE REALLY GOING TO BE TAKEN OVER BY MACHINES OR SHOULD WE EMBRACE THE MARCH OF TECHNOLOGY?

GETTING UNDER THE SKIN OF





Words:
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ARTIFICIAL INTELLIGENCE (AI) is apparently the next big thing, and it may put humanity firmly in its place as the second most intelligent species in the known universe. But what exactly is it? Should we be concerned about the possible dangers or marvel at its potential benefits to humanity? Or for those of a less philosophical and more practical nature, how can you profit from the impact of increasingly intelligent computers? *BL* tackles the big questions...

SO WHAT IS THIS AI MALARKEY THEN?

Artificial intelligence is a branch of computer science that aims to create intelligent machines that can perform tasks that normally require human intelligence. Up to now, AI has been used in discrete ways in so-called 'narrow AI systems', such as stock trading algorithms. However, researchers are also working on 'general AI', which aims to develop intelligent computers that can think and plan across broad areas, teaching themselves just like humans.

The recent victory by AlphaGo, an AI computing system built by researchers at Google, in a game of Go against a human champion illustrated that AI is on the cusp of overtaking humans in the intelligence stakes. This machine taught itself to play the game and such machines could, in time, become super-intelligent.

WILL WE BE REPLACED BY ROBOTS, LIKE IN WESTWORLD?

We may be a long way from lifelike humanoid robots, but computer intelligence is going to push many humans out of jobs. Not immediately, but soon. This is a fear that many people have,

and it's completely understandable, and not without foundation. For example, just as cars replaced horses, AI is going to do away with the need for human drivers as autonomous vehicles become the norm in a few decades. They're here already and are becoming better drivers than humans.

Even many skilled jobs are going to disappear, replaced by AI robots and algorithms. Stocks are already traded by AI, journalists are being replaced, and even accountants, lawyers and doctors might find their numbers dwindling. A recent report from the BBC suggested 95 per cent of accountancy roles in the UK are at risk of being carried out by machines within 20 years. As Lorne Daniel, an Analyst at finnCap, points out: "AI is quicker and cheaper and doesn't make mistakes."

However, Nick Bostrom, a Director at the Future of Humanity Institute, says: "We estimate that any adverse labour market impacts would be greatly outweighed by economic gains. To think otherwise would seem to entail adopting the Luddite position that a majority of current technological developments have a net negative impact."

SO WHAT ARE THE PRACTICAL IMPLICATIONS?

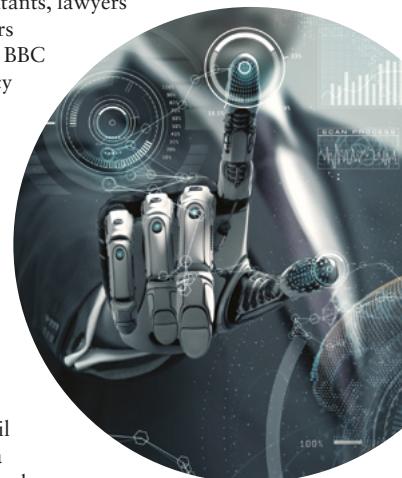
Society is going to have to plan for massive increases in unemployment. We also need to examine the ethical issues, alongside the benefits and dangers of AI technology.

In the future, we also need to ensure that there are regulations in place to ensure that this technology isn't misused and that there are sanctions for transgressors.

WILL AI EMPOWER HUMANITY AS A WHOLE OR JUST THE CHOSEN FEW WHO WILL CONTROL IT?

There's no reason in principle why AI couldn't benefit humanity as a whole, although in practice its benefits aren't likely to be equally distributed as a matter of course.

Indeed, ensuring that this technology isn't controlled by faceless corporations will be important. Tech titans Google, Facebook, Microsoft, IBM and Amazon are already teaming up to develop



new standards for AI. Who's going to provide the democratic oversight to ensure what they deliver is in the best interests of humanity?

Professor Stephen Hawking, the world-famous physicist, has also warned that AI could be the 'worst thing to happen to humanity' if it isn't properly managed, because it could be used to create 'powerful autonomous weapons, or new ways for the few to oppress the many'.

WHAT CAN GO WRONG? SHOULD WE REALLY TRUST COMPUTERS TO RUN EVERYTHING?

One of the most worrying scenarios is that we develop super-intelligent computers with goals that don't perfectly align with our own.

Bostrom argues that the development of true artificial intelligence might lead to the extinction of humanity. He's concerned that if AI acquired the ability to improve itself, it might evolve to become smarter than the human brain by many orders of magnitude, replacing humans as the dominant intelligence on the planet. Others think this is unlikely, but it probably isn't worth leaving any room for risk, given the possible consequences.

Stephen Cave, Executive Director of the Leverhulme Centre for the Future of Intelligence at the University of Cambridge, and an expert in AI, has written of the need to know

how to 'turn off' AI if necessary, writing that 'any reasonably intelligent system will seek a method to disable the off button – we have to keep one step ahead of it'.

SO HOW ARE HUMANS GOING TO CONTROL AI TO ENSURE IT DOESN'T BECOME SELF-AWARE AND PERHAPS CHOOSE TO ERADICATE US, AS IT DID IN TERMINATOR?

Cave argues that we'll "need experts to define explicitly in each setting (whether for medical robots in hospitals or tax robots in a future HMRC) precisely what the moral code is in that environment".

The trouble is, 20 years from now, how would you control some 16-year-old genius who decides it's a neat idea to build a super-intelligent robot with his friends online? Morality might be an irrelevant concept to a machine designed with only one aim in mind: to fulfil its desires.

WHAT LEGAL PROTECTION WILL NEED TO BE IN PLACE TO ENSURE AI ISN'T MISUSED?

Shaun Lowde, Head of Technology at law firm Wiggin, explains the difficulties involved in regulating AI.

"It's complicated, not least because there isn't an accepted understanding of what we mean by 'artificial intelligence' and it's a concept that evolves all the time," he explains.

"In other areas, legislators have traditionally looked to regulate products, services and processes (that is, the potential causes of problems) and a lot of the legislation that we have operates on that basis. In the future, our legislators may need to pass legislation that focuses on outcomes instead, so we don't focus on what artificial intelligence is, but on what it does, or could do."



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Lowde continues: "The real challenge lies not in pursuing companies who break the law, but in deciding what law they are breaking in the first place.

"Like the internet, artificial intelligence doesn't respect nationality, and so we may have technologies that have no boundaries that are governed by laws that do.

"We probably need to agree a common set of standards (outcomes that are universally accepted or rejected) and use that to drive our laws. Unfortunately, this is a process that's fraught with difficulties

and delay – as anyone who has followed the debates around international climate change treaties will attest."

IF I WANT TO LEARN MORE ABOUT AI, WHAT SHOULD I READ?

A good introduction is *Surviving AI* by Calum Chace. Another book for your AI library is *On Intelligence* by Jeff Hawkins. Or if you want to learn more about how bots are going to steal your job, read *The Rise of the Robots* by Martin Ford.

For those seeking a cerebral, philosophical view of the dangers and opportunities ahead, Nick Bostrom's *Superintelligence: Paths, Dangers, Strategies* is essential reading.

SO WHAT CAN WE CONCLUDE FROM ALL THIS?

You may find the whole subject of AI rather unsettling, but it's vitally important that you learn more about it since it's going to dramatically affect the future of mankind. ■

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WHERE TO PUT YOUR MONEY

Here are some options for those wishing to invest in AI.

Ewan Markson-Brown is an Investment Manager for both the Baillie Gifford Pacific Fund and the Pacific Horizon Investment Trust. About a quarter of these funds are invested in Asian stocks outside Japan, which are investing in some form of AI.

He considers that AI disruption is imminent, with the arrival of autonomous vehicles, and is impressed by Chinese internet firm **Baidu**, which comprises 3.7 per cent of his Pacific Fund. "Baidu's autonomous vehicle, which it's been working on since 2013, has already driven countless miles and successfully integrated into Beijing traffic," he explains.



Seeing Machines, a small Australian company, offers AI expertise in machine vision. Its eye and face-tracking technology will be installed in the 2017 Cadillac CT6 and it's working in the aviation and rail industries.

Google is working on developing general AI that learns just like a human brain and appears to be a good bet for the future in robotics and healthcare.