

# “ Why robot? ”



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### Investor's view: Martin Ford

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SUMMARY: Concern about technology taking our jobs is not new. History shows that on the one hand technology has destroyed jobs and on the other hand it has gone on to create entirely new occupations and industries through creative destruction. So why is this time different?



## Technology and jobs: No longer just manual work

The concern about technology taking jobs isn't new. In the past, technology has destroyed jobs, but has created many other jobs and new industries along the way. This time may be different. Job destruction may outpace job creation, while we may also face a skills mismatch where many of the new jobs require specialist skills.

Machines and algorithms are beginning to compete with brain power. Automation used to be about robots in factories or warehouses. This will certainly continue, but will go far beyond that with artificial intelligence. Any repetitive predictable task or challenge done on a computer can be addressed by a learning machine, whether it's finance or some aspects of journalism.

For our children's generation, only jobs that involve genuine creativity, such as inventing new products or interacting deeply with people, will be safe career choices. Nursing, for example, where you need deep empathy and patient relationship skills alongside medical skill, or in business where you need to build deep sophisticated relationships with clients and really understand their needs, may be 'safe' choices for a while; but beyond 20 to 30 years, who can say? For example, machines can already write symphonies and can paint original works of art.

## Technology, consumers and growth

With fewer jobs available, unemployment could rise and wages fall, especially for low-skilled jobs, and consumers may then have less to spend on all the goods being produced. This could lead to stagnation at best, or a deflationary spiral where businesses literally just can't find enough customers to grow their sales. Already some countries have relatively stagnant growth and deflation, like Japan. Technology may be one of the causal factors and it could get worse.

## Corporates in a Catch-22

This puts companies in a bit of a Catch-22. While they should benefit from increased productivity, they destroy their consumer base in the process. Companies have to continue to seek productivity and profitability in order to compete, while economy wide this dynamic inexorably destroys the purchasing power of consumers. No individual company has the power to escape.



Ultimately, this may require governments step in at some point in the future, not to prevent automation, but to replenish purchasing consumer power, perhaps in the form of a universal basic income.

## Self-driving cars: just hype?

Self-driving cars are definitely on the way, but perhaps won't be disruptive within the next five years. It's very evocative and visible, so journalists can easily write about it and imagine scenarios. So it might be a bit overhyped.

The technical challenge is immense. The real world is messy and unpredictable, with bad weather, pedestrian behaviour and falling trees, without all the precise data, so the technical challenge is much greater. Also regulation will take time to catch up to the technology, which could slow things down.

Tech may be more disruptive sooner in data-rich environments, such as Amazon warehouses. Robots are going to get better and better and do more things that workers currently do. It could happen very quickly because it's a very precise, data-rich and controlled environment. Most people haven't really assimilated just how disruptive this could be, or how soon change could come.

## Artificial intelligence and cognition

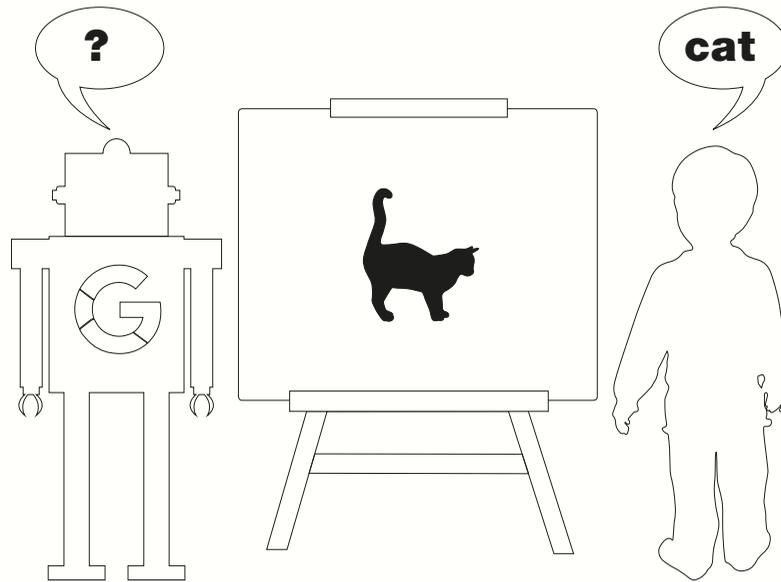
Artificial intelligence (AI) means machines or algorithms taking on genuine cognitive capability— thinking, in other words. The hype right now within AI is in machine learning, with algorithms and neural networks that can 'deep' learn.

The Holy Grail of AI is building a machine that can really reason and have general intelligence. The human brain is basically a biological machine which should ultimately be able to be fabricated in another medium. Most people working in computer science believe it's possible, but no one really knows how long it will take. It could be thirty years or more. Unless there is something really secret going on that no one knows about, we are not close yet. When it happens, it will be just incredibly disruptive.

The challenges are immense. Take when Google taught its system to recognise cats. They had to feed it millions of images of cats to get it to 'understand'. But it only takes a child once or twice to learn what the word means. This shows you just how far the brain of even a toddler is ahead of what AI can currently do.

## C is for.... 'cat'

Google's AI system had to be fed with millions of images of cats to get it to recognise them. It only takes a child one or two attempts.



### Google AI system

Requires millions of attempts before recognition

### Human child

Requires one or two attempts before recognition



To bridge the gap we need to get away from using simple structured data to teach systems. They have to be able to learn from the environment the way a child does. DeepMind, the London-based AI researcher bought by Google in 2014, is doing important work on that, but it's very much in its infancy.

### Automation, AI and investing

The most obvious and key investment opportunities are companies creating this technology, such as Google and Amazon, where there is a relationship between vast amounts of data and the ability to build AI.



The second thing is understanding that AI will become a utility, like electricity. Once invented, it will become widely available and used by just about everyone everywhere. I think the tools will get better and better, so that you won't even need to be an artificial intelligence expert or an engineer to use it. So opportunities may exist in industries best placed to leverage AI alongside massive data sets to generate value, such as health care providers or insurance. Whoever gets there first will have a massive first-mover advantage and will participate in the acceleration of AI, making it hard for other players to catch them. AI may become a type of business asset similar to human capital.

The third consideration for investors is the macro implications outlined above, with the potential for a deflationary spiral. This technology is not necessarily positive, so considering the areas threatened with disruption is also important for investors.