Why AI's Video Game Supremacy Matters for Managers

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Today Starcraft II and Dota 2; tomorrow, the business world?

This article is part of a series entitled "The Future of Management", about how changes in culture and technology are reshaping what managers do. INSEAD professors Pushan Dutt and Phanish Puranam serve as academic advisors for this series.

One of the widely acknowledged benefits of automation is that computers don't care about work-life balance. Machines can just keep plugging away until their central components give out, while humans require rest and recreation – including highly impractical pastimes like games – to stay healthy and productive. Perhaps that's why we feel so uncomfortable when we hear about machines beating our species' champions at various games. These victories seem to encroach upon uniquely human territory – an area already under severe threat in our increasingly technologised world.

Ever since Deep Blue defeated Garry Kasparov in 1997, there has been a steady stream of these stories in the international press. Given the rapid pace at which AI and machine learning are developing, we should expect to

see a lot more wins racked up by virtual gamers in the months and years to come.

What does all this mean for the future of management? Does AI's ability to master some strategy-based games at the highest level speak to the technology's potential to, one day soon, design and execute *business* strategy better than humans?

Business as a video game

DeepMind's victory at Go in 2016 made big news because Go is significantly more complicated (in terms of possible moves) than chess, and the algorithm dealt with this challenge by learning from past games, rather than being pre-programmed with the solution. Yet, the complexity of modern business decisions, with their multitude of variables and actors, may outpace that of Go by as much or more than the extent to which Go dwarfs chess.

In an attempt to better train their bots for the vagaries of real life, leading AI developers have lately turned their attention to the more dynamic, less orderly world of multi-player, team vs. team online video games. Earlier this year, DeepMind's AI bots trounced professional human players at real-time sci-fi strategy game *StarCraft II* ten matches in a row. And over the past couple of years, five OpenAI neural networks working in concert have scored a string of victories against highly reputed human teams at the multi-player battle game *Dota 2*.

Sceptics might argue that the difference between Deep Blue and DeepMind *et al.* is smaller than it seems, because even an autodidact AI doesn't know it's playing a game. Humans excel at finding ways to apply existing skills in new contexts; robot expertise is more literal and system-specific. In the absence of voluminous data for AI to absorb, smart humans may be at an advantage. The burgeoning paradigm of **transfer learning**, however, promises to narrow that gap by furnishing bots with the ability to use their knowledge more flexibly. For example, to compensate for a shortage of real-world driving data, OpenAI has reportedly been using the video game *Grand Theft Auto* to train self-driving cars. Transfer learning may represent the necessary (but tentative) first steps on the path leading to "**artificial general intelligence**".

But the path is very likely a long one. Analysing this year's *StarCraft II* matches, observers have noted that AlphaStar, DeepMind's AI player,

outperformed its human opponents at both formulating and executing strategy. When its battle plan was flawed, AlphaStar could still win through speed and icy mathematical precision, aided by an all-encompassing view of the game-play map that humans – dependent on eyes, hands and a mouse – could never hope to match. In a sportsmanlike gesture, the bot's sweeping vision was restricted to one window at a time (replicating our optical limitations) in the final bout – and it lost. At least some of the advantage of AI at games is simply this unimpaired sight, which may be much harder to replicate in business contexts.

Strategy and sociability

In defence of *Homo sapiens*, one could also argue that computers may supersede us strategically but never socially. Without the ability to coordinate with one another, AI would lack our talent for mounting multi-pronged approaches to challenges. But according to Julien Clément, who studied Dota 2 professional teams for his INSEAD PhD dissertation, coordination may be the very reason why AI beats us at team games. Clément notes that the OpenAI Five won by applying complex strategies which humans don't dare to implement because coordinating closely in real-time is too cognitively challenging. For instance, instead of having a fixed division of labour like human teams, the AI fivesome rapidly and repeatedly switched the allocation of roles among players. Hence cooperation may thrive amongst bots even more than beasts. We can see glimmers of the coming age of collaborative algorithms in the decentralised ecosystem that is currently forming at the nexus of blockchain and AI. For example, some predict that "smart contracts" pegged to blockchain activity may enable far-flung neural networks to work together to repair flaws and inconsistencies in the legal system.

If you are a manager in need of some consolation by now, INSEAD professor Pushan Dutt points out that for managers to be truly replaced by AI, humans would have to disappear from organisations, and that seems unlikely to happen anytime soon. "There's no smooth path from all humans to all algorithms," Dutt says. And as long as there is a need for humans, there will be – to some degree – a need for human managers. No matter how well bots may mimic our **writing** and **speech**, human beings have shown strong resistance to being motivated and persuaded by AI. "The ultimate advantage of human decision making," says Phanish Puranam, "may well be that it is human – it produces decisions acceptable to fellow humans because of its human origins." If that's true, the human touch that managers bring to their

job is their own best defence.

Find article at

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About the series

Future of Management

Changes in culture and technology are reshaping strategies, decisions and processes in business and beyond. Take a deep dive into what managers are doing – or need to do – to make the most of disruptions brought about by remote working, algorithms and digital transformation.