DeepMind AI thrashes human professionals at video game StarCraft II

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Artificial intelligence has beaten humans at chess, Scrabble and Go – and now it has the better of us at real-time strategy video game StarCraft II. In two best-of-five series, DeepMind's AI defeated two top-ranked professionals 5-0.

"This is of course an exciting moment for us," said David Silver at DeepMind in a live stream watched by more than 55,000 people. "For the first time we saw an AI that was able to defeat a professional player."

In StarCraft II, players have to control armies across a terrain. They have to build infrastructure, juggling short-term gain with long-term benefits. They also can't always see the full map, so must act on hunches and intuition rather than firm action.

DeepMind created five versions of their AI, called AlphaStar, and trained them on footage of human games. The different AIs then played against each other in a league, with the leading AI accumulating the equivalent of 200 years of game experience.

With this, AlphaStar beat professional players Dario Wunsch and Grzegorz Komincz – ranked 44th and 13th in the world respectively.

"It looks like a big step forward," says Sebastian Risi at the IT University of Copenhagen, Denmark. We don't yet know how much new innovation in the AI algorithms there is, but the way it's trained seems to be key, he says.
Processing power

AlphaStar's success came with some caveats: the AI played only on a single map, and using a single kind of player (there are three in the game). The professionals also had to contend with playing different versions of AlphaStar from match to match.

While the AlphaStar was playing on a single graphics processing unit, a computer chip found in many gaming computers, it was trained on 16 tensor processing units hosted in the Google cloud – processing power beyond the realms of many.

An experimental version of the AI did lose a game played live. This AlphaStar was trained for less time, was playing a different style, and crucially had its view restricted to the typical game view used by human players. The version that vanquished the pro gamers relied on a zoomed-out view of the entire map, but human players tend to use this less as it's very difficult to perform many of the game's moves in this view.

"I didn't expect anything like this," says Niels Justesen at the IT University of Copenhagen, Denmark, "especially because previous attempts of learning StarCraft end-to-end have been very far from human level."

Eventually, the sort of skills an AI needs for playing StarCraft could transfer into other areas. "I think StarCraft is like running a company, in particular a logistic operation," says Julian Togelius at New York University. "It's all about planning research and development, and to get the goods to the right place at the right time, avoiding bottlenecks."

AlphaStar may also help professionals improve their strategies."It is actually exciting if AI finds new ways to play a game optimally," says Georgios Yannakakis of the University of Malta. "This is one of the reasons one builds AI after all."