Google DeepMind: AI becomes more alien

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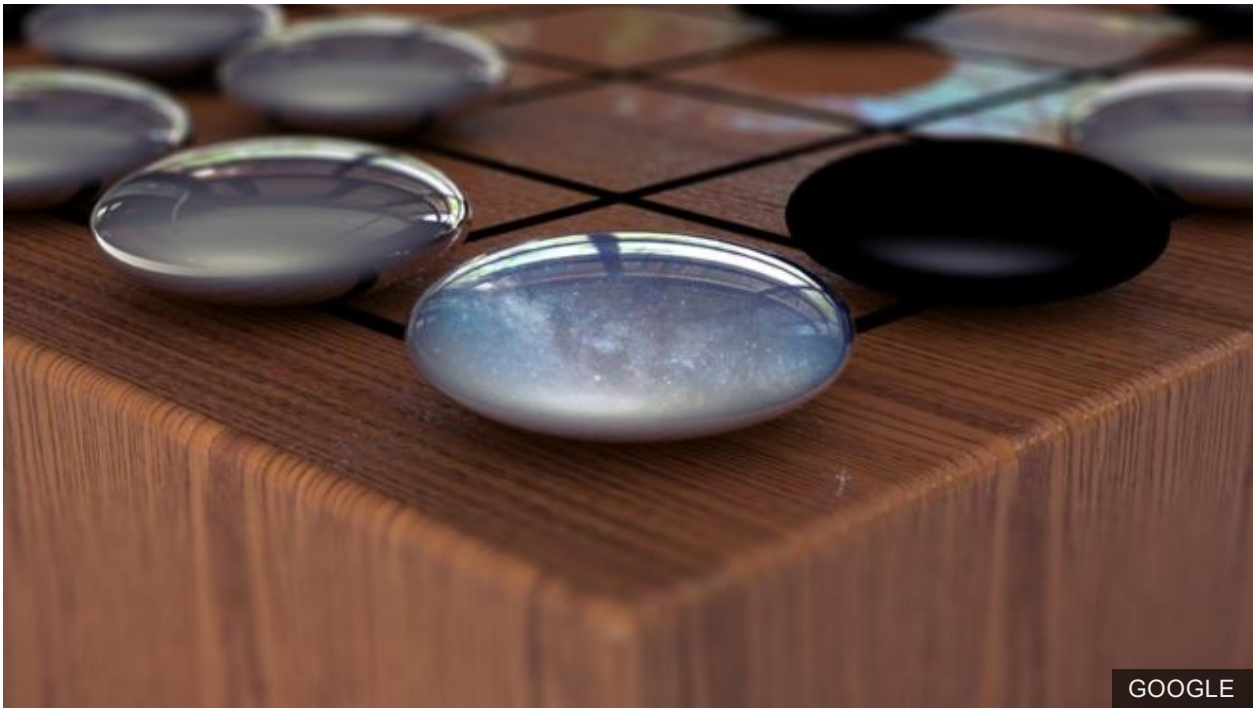

Google's DeepMind says it has made another big advance in artificial intelligence by getting a machine to master the Chinese game of Go without help from human players.

The AlphaGo program, devised by the tech giant's AI division, has already beaten two of the world's best players.

It had started by learning from thousands of games played by humans.

But the new AlphaGo Zero began with a blank Go board and no data apart from the rules, and then played itself.

Within 72 hours it was good enough to beat the original program by 100 games to zero.

DeepMind's chief executive, Demis Hassabis, said the system could now have more general applications in scientific research.

"We're quite excited because we think this is now good enough to make some real progress on some real problems even though we're obviously a long way from full AI," he told the BBC and other journalists.

The London-based artificial intelligence company's software defeated leading South Korean Go player Lee Se-dol by four games to one last year.

In a game where there are more possible legal board positions than there are atoms in the universe, it was a triumph for machine over man and one that came much earlier than many in the AI world had expected.

AlphaGo followed this with the defeat of the world's number one Go player, China's Ke Jie, in May.

As with many advances in this field, the achievements required the combination of vast amounts of data - in this case records of thousands of games - and a lot of computer-processing power.

David Silver, who led that effort, says the team took a very different approach with AlphaGo Zero.

"The new version starts from a neural network that knows nothing at all about the game of Go," he explained.

"The only knowledge it has is the rules of the game. Apart from that, it figures everything out just by playing games against itself."

What is Go?

Go is thought to date back to ancient China, several thousand years ago.

Using black and white stones on a grid, players gain the upper hand by surrounding their opponents' pieces with their own.

The rules are simpler than those of chess, but a player typically has a choice of 200 moves at most points in the game, compared with about 20 in chess.

It can be very difficult to determine who is winning, and many of the top human players rely on instinct.

This has turned out to be far more efficient way of addressing the problem.

Whereas AlphaGo took months to get to the point where it could take on a professional, AlphaGo Zero got there in just three days, using a fraction of the processing power.

"It shows it's the novel algorithms that count, not the compute power or the data," says Mr Silver.

He enthuses about an idea some may find rather scary - that in just a few days a machine has surpassed the knowledge of this game acquired by humanity over thousands of years.

"We've actually removed the constraints of human knowledge and it's able, therefore, to create knowledge itself from first principles, from a blank slate," he said.

Whereas earlier versions quickly learned from and improved upon human strategies, AlphaGo Zero developed techniques which the professional player who advised DeepMind said he had never seen before.

Many of the team have now moved on to new projects where they are trying to take this technique to new areas. Demis Hassabis mentions drug design and the discovery of new materials as areas of interest.

Whereas some see a threat from AI, he looks ahead with optimism.

"I hope these kind of algorithms will be routinely working with us as scientific experts medical experts on advancing the frontiers of science and medicine - that's what I hope," he says.

But he and his colleagues are cautious about how rapidly we will see the wider application of these AI techniques - a game with clear rules and no element of luck is one thing, the messy, random, unpredictable real world quite another.

I wrote earlier this week about **the tidal wave of AI hype** pouring into my email inbox. AlphaGo Zero is at the other end of the spectrum - proper peer-reviewed science with a real advance in computer intelligence.

We need to keep a close eye on the ethical dilemmas involved in developing a machine that, by some definitions, can think for itself - especially when it is controlled by a giant like Google.

But for now, there are few signs that AlphaGo Zero and its ilk will either steal our jobs or threaten to make humanity obsolete.

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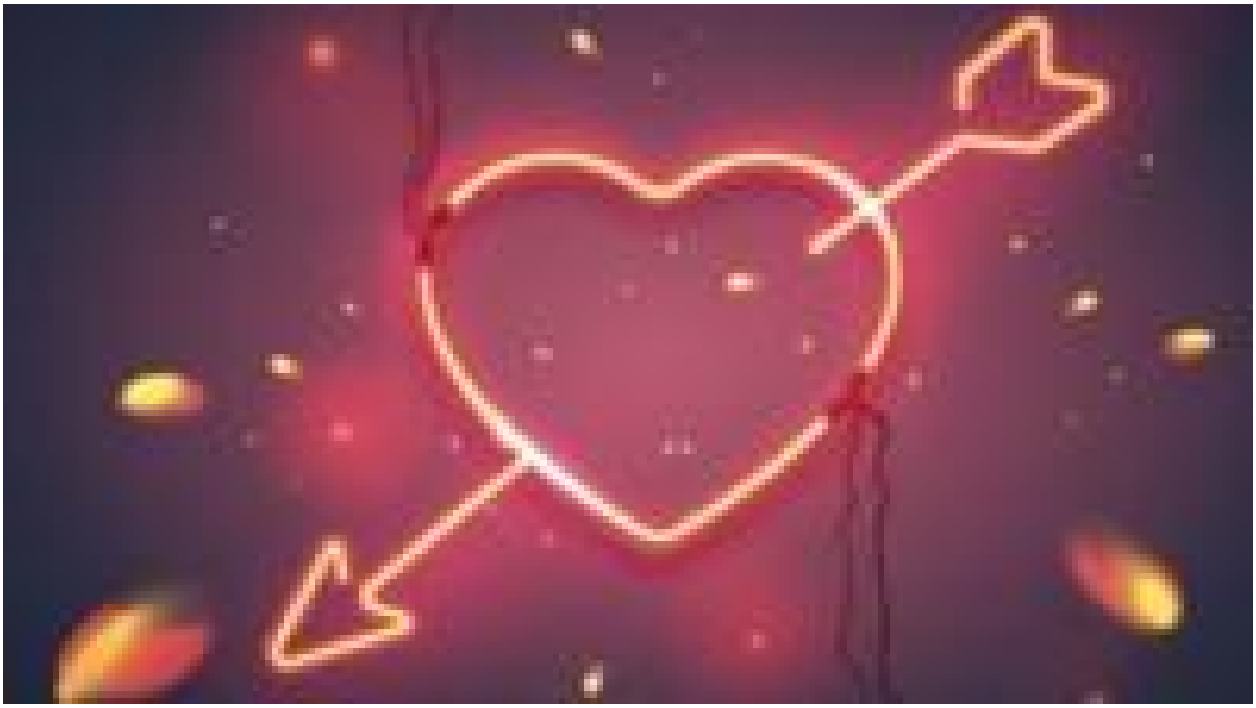

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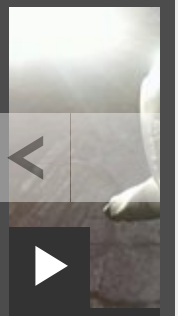

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