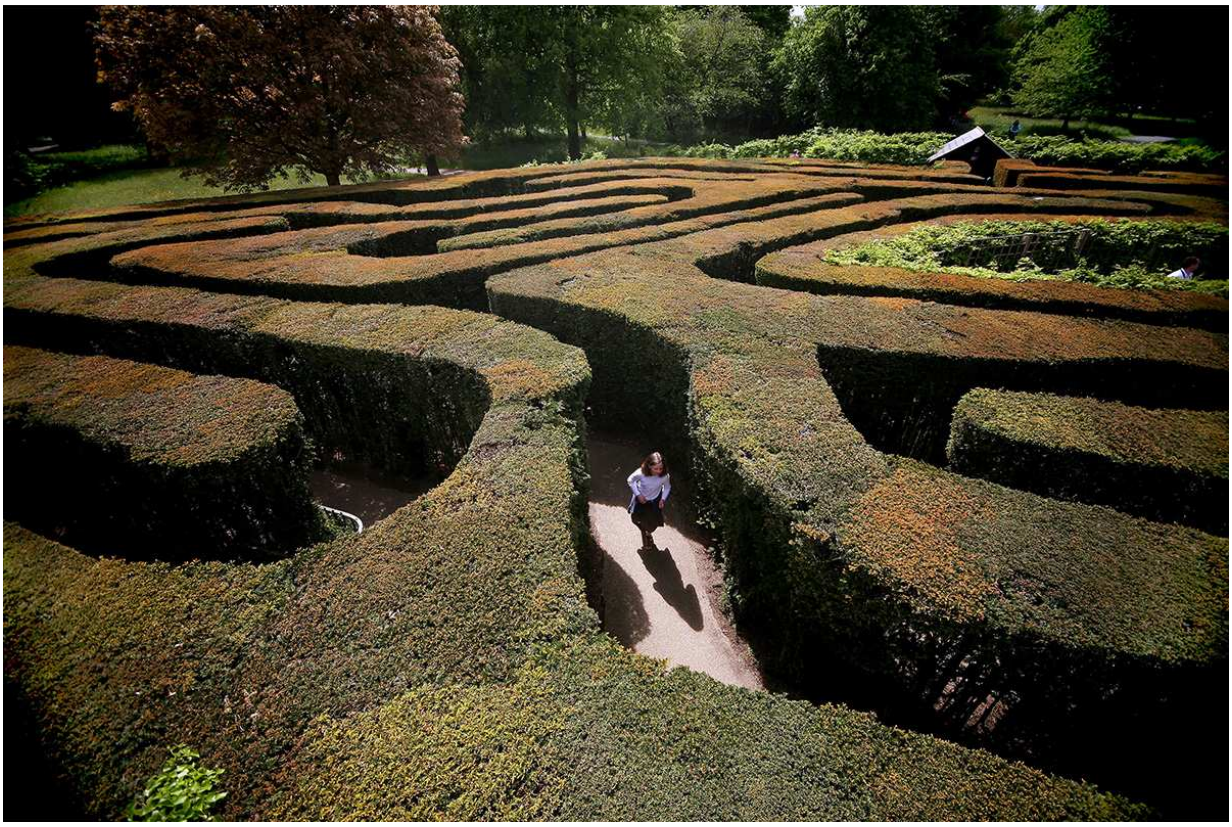
New Scientist

DAILY NEWS 9 May 2018

DeepMind AI developed navigation neurons to solve a maze like us



Our brains light up when we navigate a maze – the AI seems to work in a similar way
Description:Dan Kitwood/Getty

By **Leah Crane**

Artificial intelligence is winning the rat race. Google-owned DeepMind has built an artificial intelligence that is better at navigating a maze than humans. After it was trained with data on how rodents search for food, it mimicked the processes that allow mammals to get between destinations in the most efficient way.

Humans and other mammals have neurons called "grid cells" that help us find our way as we navigate our surroundings. They're a sort of map, like a tiled floor where a certain tile lights up each time you step on it. The neurons are arranged in a tile pattern in the brain, and they fire as you move to calculate where you are and how to get from one location to another.

A team of researchers at DeepMind and University College London have created an AI

that has learned to do the same thing. It was trained to navigate a virtual square environment by seeing the trajectories of foraging rodents.

When the researchers inspected how the AI was navigating the environment, they found a grid-like pattern that would function in a similar way to how grid-cells work.

“The grid cells we found were startlingly like the ones you see in a mammalian brain,” says Caswell Barry at University College London. “It’s just as similar to a human grid cell as one you might record from a rat.”

Robot rat brain

When the researchers placed obstacles in the environment or opened and closed doors, the AI could determine the fastest route to its destination, even if it had never travelled that route before. It was even better at finding shortcuts than a professional gamer moving around a digital representation of the square room.

The fact that these cells emerged on their own hints that evolution did a good job of finding the best way to solve the problem of path integration. “We want to know to what extent a human or animal mind is an optimal system, and this is a good argument that these grid cells are pretty nice and well-optimised,” says Chris Lucas at the University of Edinburgh.

However making it work in a real world setting may be more of an engineering challenge, he says.

The AI also developed other cells around the grid cells that were similar to other types of neurons that are important in navigation. “There are all these other similarities with the bit of the mammalian brain that navigates,” says Barry. “Their presence makes us believe more strongly that we’ve generated something with a meaningful correspondence to the brain.”

It’s a mutually beneficial collaboration between neuroscience and machine learning, says DeepMind’s Andrea Banino. Biological intelligences can teach us how to build artificial ones, at the same time as those artificial neural networks can help us study real live brains.

Journal reference: *Nature*, DOI: 10.1038/s41586-018-0102-6

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