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Future robot swarms should copy lazy ants who let others do the work



When tunnelling some ants do none of the work – turns out that's a good strategy

Grant Heilman Photography / Alamy Stock Photo

By Timothy Revell

Too many cooks spoil the broth, and the same goes for ants. A study into how ants cooperate has found that the optimum strategy is for most of them not to do any work. The findings may be useful for creating large swarms of robots.

Ants create networks of narrow underground tunnels by excavating soil bit by bit as a team. To understand the strategies they use, Daniel Goldman at Georgia Tech and his colleagues placed 30 ants into a transparent container filled with glass soil-like particles.

For 48 hours ants entered and exited the tunnels hundreds of times to extend the network, but surprisingly only 30 per cent of the ants did around 70 per cent of the work.

“Only a few ants would do the majority of the work, with the rest just hanging out trying to avoid clogging up the tunnel,” says Goldman.

To further understand the process, Goldman and his colleagues tested out different strategies with four excavation robots. “One dug OK. Two dug OK. Three was kind of good. But with four the robots just couldn’t get anywhere,” says Goldman.

Traffic jam

However smart his team made the robots they kept causing clogs unless some took a back seat. The results suggest when groups of individuals work together, the best strategy may be for some to hang back, he says.

The work can help uncover some of the strategies that biological organisms have evolved to use, but may also help write better software for controlling swarms of robots.

Although swarms of drones have performed impressive coordinated aerial displays, such as those at last year’s Winter Olympic Games opening ceremony, performing similar tasks on the ground can be more difficult because of the constrained space.

By learning from ants, Goldman hopes that he can find ways for large swarms of robots to coordinate in confined places such as caves or disaster zones.

“If I wanted to send a bunch of robots into a Thai cave or a disaster area filled with rubble it’s really hard. We still don’t know how to do that,” says Goldman.

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