

Robots eating other robots: The benefits of machine metabolism

For decades we've been trying to make the robots smarter and more physically capable by mimicking biological intelligence and movement. "But in doing so, we've been just replicating the results of biological evolution—I say we need to replicate its methods," argues Philippe Wyder, a developmental robotics researcher at Columbia University. Wyder led a team that demonstrated a machine with a rudimentary form of what they're calling a metabolism.

He and his colleagues built a robot that could consume other robots to physically grow, become stronger, more capable, and continue functioning.

Nature's methods

The idea of robotic metabolism combines various concepts in AI and robotics. The first is artificial life, which Wyder termed "a field where people study the evolution of organisms through computer simulations." Then there is the idea of modular robots: reconfigurable machines that can change their architecture by rearranging collections of basic modules. That was pioneered in the US by Daniela Rus or Mark Yim at Carnegie Mellon University in the 1990s.

Finally, there is the idea that we need a shift from a goal-oriented design we've been traditionally implementing in our machines to a survivability-oriented design found in living organisms, which Magnus Egerstedt proposed in his book *Robot*

Ecology.

Wyder's team took all these ideas, merged them, and prototyped a robot that could "eat" other robots. "I kind of came at this from many different angles," Wyder says.

The key source of inspiration, though, was the way nature builds its organisms. There are 20 standard amino acids universally used by life that can be combined into trillions of proteins, forming the building blocks of countless life forms. Wyder started his project by designing a basic robotic module that was intended to play a role roughly equivalent to a single amino acid. This module, called a Truss Link, looked like a rod, being 16 centimeters long and containing batteries, electronic controllers, and servomotors that enabled them to expand, contract, and crawl in a straight line. They had permanent magnets at each end, which let them connect to other rods and form lightweight lattices.

<https://arstechnica.com/science/2025/07/robots-eating-other-robots-the-benefits-of-machine-metabolism/>