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August 30, 2000

SEARCH



## Picking up a Cylinder

Robots  
Self-Replicate, Team  
Up

By Jennifer Viegas,  
Discovery.com News

Aug 30, 2000 -- Two extraordinary new studies brought robots closer to life this week.

The first study, published in the journal *Nature*, outlines a method where a robot can design other machines with little human input.

Researchers Hod Lipson and Jordan Pollack of the Volen Center for Complex Systems at Brandeis University first created a virtual workspace consisting of bars, actuators (piston-like motors) and neurons -- meant to simulate bones, muscles and brain activity -- on a computer.

They then linked this to another computer with prototyping capabilities that continuously arranged and rearranged the basic components until the fittest, or best moving, robots were built.

Lipson explained, "The designing machine is controlling the fabrication machine, but we can think of both these units as parts of one big robot."

While the design process occurred only in a virtual environment, experts believe it is an important step toward the day when artificial life systems are able to exist autonomously in the real world.

In an accompanying commentary, Rodney Brooks of MIT's Artificial Intelligence Lab wrote, "Although we are still a long way from that goal, Lipson and Pollack have at last demonstrated a computational system that designs functional machines and builds them with almost no human intervention."

Pollack added, "We can immediately envision a collection of 151 wacky toy robots as popular as Pokemon, to automatic cleaning machines specific to certain environments, like after a soccer game at a particular stadium, to robots cheap enough to find and destroy landmines in different parts of the world, to fixed industrial assembly applications for short term production."

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Taking a different path towards somewhat similar goals, another team of researchers has, for the first time, created a group of robots that work together like an ant colony in gathering "food."

Laurent Keller, professor and head of the department of ecology at the University of Lausanne in Switzerland, and his colleagues programmed a group of small robots to collect plastic cylinders simulating food and to bring the food back to a designated nest area. Additionally, the robots were programmed to communicate information about resource-rich areas to their colony mates, and to avoid bumping into each other.

Findings were also published in this week's Nature.

The food-gathering effort was a resounding success, except when the researchers increased the number of robots. After a certain point, like an over-populated insect colony, the bots wound up banging into each other, minimizing collection efforts.

Still, Keller said, "Robot (teams) could be used in dangerous areas, for example those with field mines or those that are radioactive. It is difficult to say how soon this could be put into practice."

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