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Hexapod robot moves in the right direction by controlling chaos

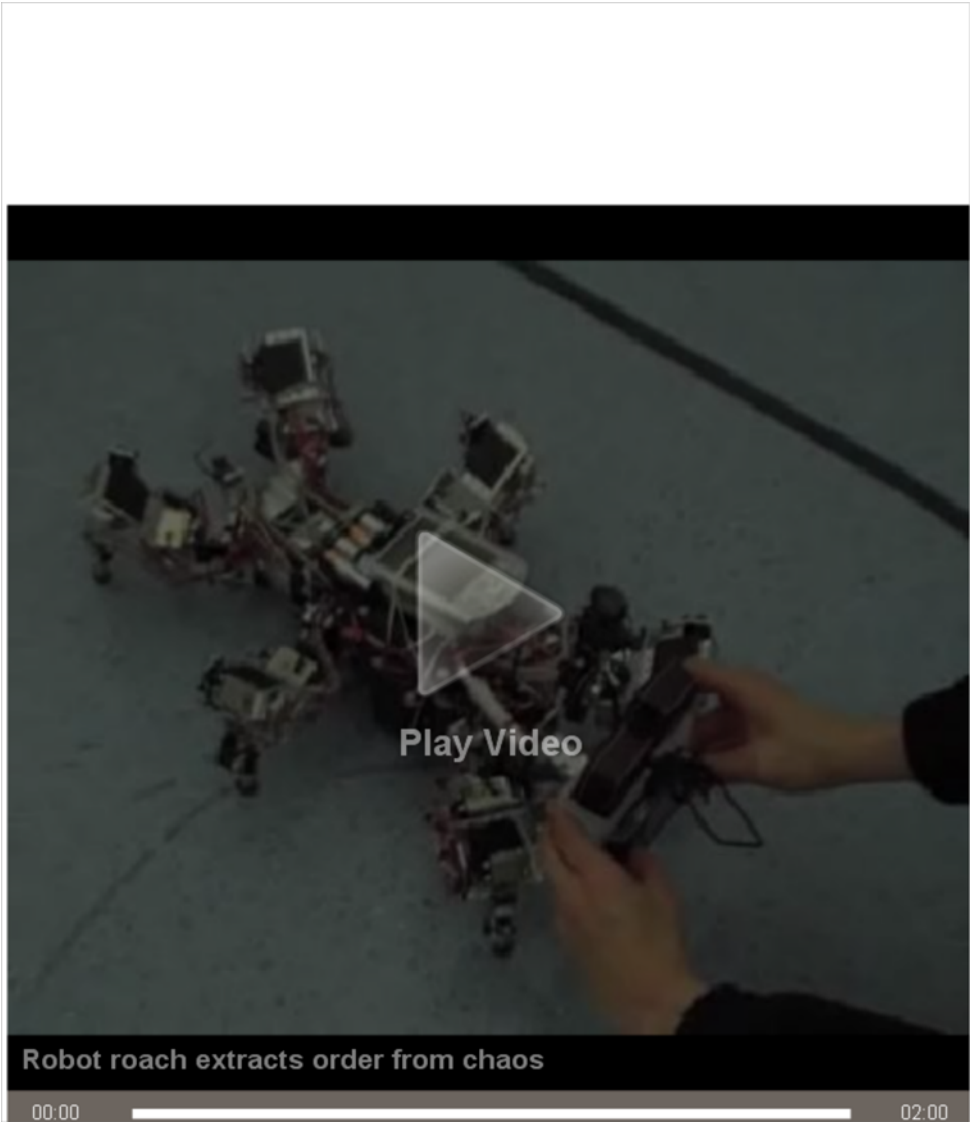
By Larry Greenemeier

Given that robots generally lack muscles, they can't rely on muscle memory (the trick that allows our bodies to become familiar over time with movements such as walking or breathing) to help them more easily complete repetitive tasks. For autonomous robots, this can be a bit of a problem, since they may have to accommodate changing terrain in real time or risk getting stuck or losing their balance.

One way around this is to create a robot that can process information from a variety of sensors positioned near its "legs" and identify different patterns as it moves, a team of researchers report Sunday in *Nature Physics*. (*Scientific American* is part of Nature Publishing Group.)

Some scientists rely on small neural circuits called "central pattern generators" (CPG) to create walking robots that are aware of their surroundings. One of the challenges is that the robot typically needs a separate CPG for each leg in order to sense obstacles and take the appropriate action (such as stepping around a chair leg or over a rock).

Bernstein Center for Computational Neuroscience researcher Poramate Manoonpong and Max Planck Institute for Dynamics and Self-Organization researcher Marc Timme are leading a project that has created a six-legged robot with one CPG that can switch gaits depending upon the obstacles it encounters. The robot does this by manipulating the sensor inputs into periodic patterns (rather than chaotic ones) that determine its gait. In the future, the robot will also be equipped with a memory device that will enable it to complete movements even after the sensory input ceases to exist.



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