

ROCR

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A new robot with two claws and a tail that sways like a pendulum is the first robot designed to move efficiently like human rock climbers or apes swinging through trees. This small robot, named ROCR (pronounced "rocker"), can scramble up a carpeted, eight-foot wall in just over 15 seconds. A robot of this design could eventually be used for inspection, maintenance and surveillance, according to its makers, or it can be a really cool toy for children.

Developer of this robot is William Provancher, an assistant professor of mechanical engineering at the University of Utah.

While prior climbing robots have focused on issues such as speed, adhering to the wall, and deciding how and where to move, ROCR is the first to focus on climbing efficiently," Provancher said.

One previous climbing robot has ascended about four times faster than ROCR, which can climb at 15.7 centimeters per second, but ROCR achieved 20 percent efficiency in climbing tests, "which is relatively impressive given that a car's engine is approximately 25 percent efficient," Provancher said. The robot's efficiency is defined as the ratio of work performed in the act of climbing to the electrical energy consumed by the robot.

Previous climbing robots have been large, with two to eight legs. ROCR, in contrast, is small and lightweight: only 31 centimeters wide, 46 centimeters long from top to bottom and weighing only 0.54 kilogram.

Provancher said the study is the first to set a benchmark for the efficiency of climbing robots against which future models may be compared. He said future work will include improving the robot's design, integrating more complex mechanisms for gripping to walls of various sorts, such as brick and sandstone, and investigating more complex ways of controlling the robot – all aimed at improving efficiency. "Higher climbing efficiencies will extend the battery life of a self-contained, autonomous robot and expand the variety of tasks the robot can perform," Provancher said.

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