Video: Robots adapt to injury

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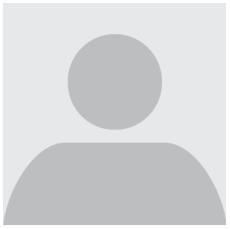

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1 Comment

When a robot breaks a limb, it is typically left completely helpless, unable to overcome its disability. But in the video above, robots are doing something they've never done before—choosing the best way to walk after an injury. To perform this feat, the six-footed robots rely on a previously generated map of 13,000 different combinations of leg movement that produce a predicted outcome. In the course of generating this map, the robots "learn" to walk, each developing slightly different solutions from its peers: Some determine that it's best to walk on all six legs, whereas others prefer just three, four, or some hybrid. If an injury ruins the robot's gait, the machine goes back through its catalog and tests other behaviors that generated efficient movement prior to the injury—perhaps walking with four legs instead of six, for example. Then, feedback from its trial is used to refine additional searches for walking strategies. A robot with a damaged front right leg might quickly be able to determine that strategies that relied heavily on that appendage aren't going to be successful, even though it doesn't "know" which leg is malfunctioning. The new research, published online today in *Nature*, is different from other previously attempted robot fixes because it does not require a programmer to envision every way the robot could fail and write instructions for each case; the robots come to their own conclusions independently. The new algorithm could also let "healthy" robots overcome new obstacles, like walking on new kinds of terrain. The bots could try different strategies, analyze the feedback, and choose a new best tactic. The researchers note that much of the technique's power relies on having the large pool of strategies to pull from, but the algorithm is still widely useful—it has already been used with the robotic arm seen in the video, for example, and the researchers think it will be applicable to many other systems in the future. The algorithm could help keep future planetary rovers or deep-sea probes operating longer even if they take some damage.

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