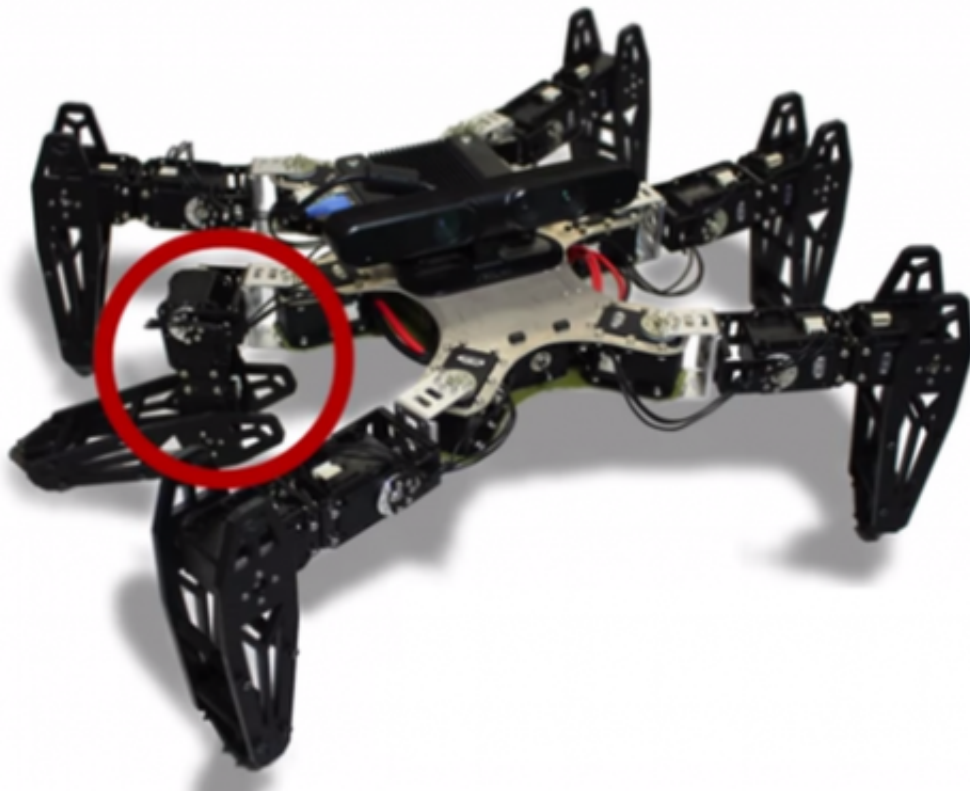


# Researchers develop algorithm that allows robots to walk after legs are damaged or broken (w/ Video)

July 31 2014, by Bob Yirka

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A trio of researchers has developed an algorithm that when added to the code of walking robots, allows them to recover from a damaged or broken leg and resume walking. In their paper uploaded to the preprint

server *arXiv*, Antoine Cully, Jean-Baptiste Mouret and Jeff Clune of the Sorbonne and the University of Wyoming, respectively, describe what their new algorithm does and how it might be used by robots in the future.

The research trio note that robots, unlike animals (including human beings), don't do well when damaged. Dogs and cats for instance very quickly learn to run around on just three legs if need be. A [robot](#) with a broken leg on the other hand, is generally completely out of commission. What was needed, the team decided, was a means for allowing robots to be alerted to the fact that something has gone wrong, and then to allow them to choose from a variety of options to overcome what has occurred. With robots, that means giving them a way to take note of a broken or damaged leg that it is preventing them from walking. Once that happens they can engage in a trial and error process where a robot tries out the options offered by the algorithm and after running through all of them, chooses the one that works best. The team found that their algorithm allowed a test robot to walk almost as fast as it was able to prior to injury. They also found that it worked with different types of injuries as well, from partially to completely disabled legs, no matter which leg was disabled. In each case, the robot diligently tested out several approaches to walking with a damaged leg and then chose the approach that worked best—which the researchers note, is pretty much how animals do it.

Obvious applications of the new technology would be with robots used in warfare (bringing to mind the Terminator), on space missions and in disaster zones. Less obvious might be robots serving critical functions such as taking care of the sick or injured, or those used in remote locations as sensors.

Others are also working on similar problem solving technology, known as adaptive robotics—where robots learn to overcome problems that

can't be programmed in advance—how to walk over unfamiliar terrain, for example, or what to do if a door closes leaving no way out.

**More information:** [arxiv.org/abs/1407.3501](https://arxiv.org/abs/1407.3501)

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