



Follow 375k



Search by keyword

find

TECHNOLOGY

Self-Healing Robot Can Adapt To Injury Within Minutes

May 27, 2015 | by Aamna Mohdin

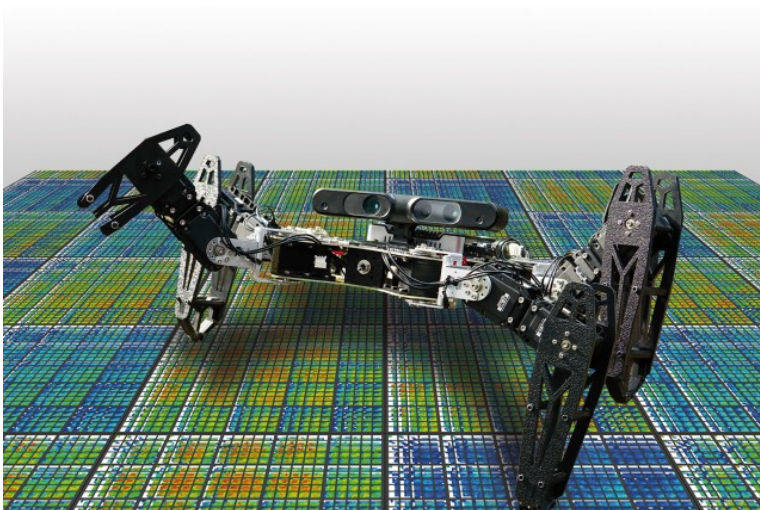


photo credit: Antoine Cully



From putting out forest fires to grabbing you a cup of coffee, robots have the potential to be hugely beneficial to humans. The problem, however, is that they seem to fall apart when they're injured. A new study [published in Nature](#) may have just overcome this hitch by creating a robot that learns to adapt to its injuries. What could possibly go wrong?

Researchers from [Pierre and Marie Curie University](#) and the [University of Wyoming](#) have created a robot that is able to get back on its feet—literally—after two of its legs were broken. They also developed a robotic arm that is able to place a ball into a can, despite having several broken motors.

"When injured, animals do not start learning from scratch," senior author [Jean-Baptiste Mouret](#) said in a [statement](#). "Instead, they have intuitions about different ways to behave. These intuitions allow them to intelligently select a few, different behaviors to try out and, after these tests, they choose one that works in spite of the injury."

For example, if you hurt your ankle, you quickly try to find a way to overcome the injury by testing out new ways to walk. Using this principle, researchers created an algorithm called 'Intelligent Trial and Error' that makes a detailed map of the different behaviors the robot can perform and allows them to adapt to unexpected situations.

"Once damaged, the robot becomes like a scientist. It has prior expectations about different behaviors that might work, and begins testing them. However, these predictions come from the simulated, undamaged robot. It has to find out which of them work, not only in reality, but given the damage," says lead author Antoine Cully in a [statement](#).

"For example, if walking, mostly on its hind legs, does not work well, it will next try walking mostly on its front legs. What's surprising is how quickly it can learn a new way to walk. It's amazing to watch a robot go from crippled and flailing around to efficiently limping away in about two minutes," he adds.

Intelligent Trial and Error undergoes two crucial steps; the first involves a new type of evolutionary algorithm called MAP-Elites to create a behavior-performance map. MAP-Elites depends on Darwin's concept of 'survival of the fittest' to create competitions in computer simulations, which evolve artificially intelligent robots. In the second step, the robots uses its prior knowledge provided by the first step to adapt to specific damages.

Researchers hope this new technique can lead to the development of more 'autonomous' robots. To see the robots in action, watch the video below.

Choose your poison

Editor's Blog

Environment

Technology

Space

Health and Medicine

The Brain

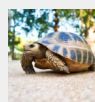
Plants and Animals

Physics

Chemistry



POPULAR POSTS



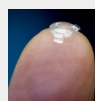
Happy World Turtle Day!

plants and animals



Planet Earth Now Has A Flag

space



This Lens Could Give You Superhuman Vision

health and medicine



California Set To Give Solar Panels To Low-Income Families For Free

environment

Read this next: [According To Science, You've Probably Been Pooping Wrong Your Whole Life](#)

From The Web



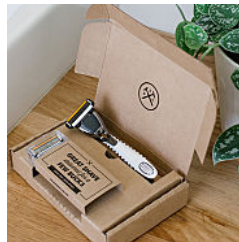
Transferring a card balance every 21 months is ingenious

NextAdvisor



3 Harmful Foods To Avoid

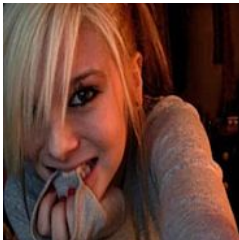
Slim Force 4 Supplement



How This Razor is Disrupting a \$13 Billion Industry

Dollar Shave Club

Sponsored Links by Taboola



This Weird "Method" Will Make Her Your Girlfriend

Girlfriend Activation System



4 in 5 Americans Are Ignoring Buffett's Warning

The Motley Fool



6 Best Credit Cards For Those With Excellent Credit

CardRatings.com

More From The Web

- **20 Photos That Are Sure To Make You Cringe** (LOL WOT)
- **Transferring your credit card balance every 21 months is ingenious** (NextAdvisor)
- **6 Best Credit Cards For Those With Excellent Credit** (CardRatings.com)
- **Are You Lazy but Want to Get into Shape? Try this Easy Workout** (DailyBurn Subscription)
- **Ancient Spider-Like Predator Resurrected**
- **Bizarre Deformed "Unicorn" Found In Slovenia**
- **New human body part discovered**
- **Giant Alien-Like 'Shrimp' Caught Off Florida Is Identified**

Promoted Links by Taboola

tags robots, injury, adapt, animal, learning, MAP-Elites

More Stories

Sponsored Links by Taboola



10 Exclusive Experience That Will Take You Off...

Classic Journeys



5 Credit Cards with No Interest to Help You Get out of...

NextAdvisor



6 Best Credit Cards For Those With Excellent...

CardRatings.com



How This Razor is Disrupting a \$13 Billion Industry

Dollar Shave Club

IFLScience

**WIKI
SCIENCE**

Newsletter



Your email address

Sign up

Get Weekly Science Coverage!

Connect with Us



10

Comments

IFL Science

1 Login

Recommend 2

Share

Sort by Newest



Edgar M · 5 days ago

Why is it people always attribute the phrase "survival of the fittest" to Charles Darwin? It was Herbert Spencer, an economist, who coined the term because he drew parallels between the theory of natural selection and his own economic ideals. "Survival of the fittest" is not a scientific concept.

3 ^ | v · Share >



JayJay · 5 days ago

What I would do, is to run the program to determine the best possible speed achievable. If the program figured out how to move faster with one broken leg than without, how much it could enhance the performance eventually?

^ | v · Share >



Rikard Johansson · 5 days ago

If you look real close, you can almost see a young Gina Inviere!

1 ^ | v · Share >



Rodfire · 5 days ago

why are they making them spider like though, arachnophobia anyone?

^ | v · Share >



Andreas Nordeng → Rodfire · 5 days ago

Spiders have eight legs...

3 ^ | v · Share >



David → Rodfire · 5 days ago

If you want to really know, then study mechanics... If you want to "feel" it, install and play robocraft :D

3 ^ | v · Share >



Robomummy · 5 days ago

While interesting I would like to point out that adaptation to injury is not healing of said injury. Therefore the robot adapts rather than heal itself.

6 ^ | v · Share >



GC → Robomummy · 5 days ago

Clickbait again, heh.

Less attention-grabby this time though at least...

1 ^ | v · Share >



Ella Burrows · 5 days ago

Oh yay! We inch ever closer to true Cylons. This article actually filled me with dread, they took away their one weakness and made them better than us because they don't feel pain. Maaaaybe I'm being a conspiracy theorist, but surely, when you shoot a robot you don't want it getting back up?

1 ^ | v · Share >



Max Vemic → Ella Burrows · 5 days ago

Why shoot it in the first place? They don't need to be aggressive towards anything unless we program them that way.

3 ^ | v · Share >

ALSO ON IFL SCIENCE

Creationist And Scientists Combine In Fossil Discovery

774 comments · 17 hours ago

Mike Estes — There ya go. Even when they discover the evidence themselves, they won't believe it ...

Cheetah Robot Jumps Over Hurdles Without Slowing Down

88 comments · 16 hours ago

BartyLobethal — Foreground: incredible piece of semi-autonomous engineering. Background: bloke ...

20-Year-Old To Launch World's First Ocean Cleaning System In ...

54 comments • 16 hours ago



Joshua Johns — Hmm, can we put some sort of scientific equipment on it too so we can collect more ...

Contact Re-Established With Bill Nye's LightSail

2 comments • 11 hours ago



Psycho Jedi — "If the craft continues to operate as planned, deployment of its sails could be scheduled for the ...

 [Subscribe](#)

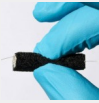
 [Add Disqus to your site](#)

 [Privacy](#)

DISQUS



MORE TECHNOLOGY ARTICLES



Scientists Create 3D, High-Capacity Soft Batteries Using Trees

technology



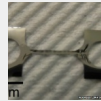
Google Teams Up With Levi's To Create Wearable Electronics

technology



Watch A Cheetah Robot Jump Over Hurdles Without Slowing Down

technology



This Alloy Can Withstand 10 Million Transformations

technology



Meet The Glow-In-The-Dark Shark

Scientists Create Biodegradable Computer Chips



get the newsletter

Sign up 



Follow

375k



[home](#)

[contact](#)

[Advertising](#)

[Privacy Policy](#)

[Terms of Use](#)