

39.6%  
35%  
33%  
28%

**We'll help you get into a higher tax bracket.**  
*Sorry. And you're welcome.*

**LEARN MORE >**

## TECHNOLOGY

[TECHNOLOGY](#) | [RE/CODE](#) | [MOBILE](#) | [SOCIAL MEDIA](#) | [ENTERPRISE](#) | [GAMING](#) | [CYBERSECURITY](#)

# Robots learn to adapt to damage the way animals do



75  
SHARES

Robert Ferris | [@RobertoFerris](#)  
Wednesday, 27 May 2015 | 1:00 PM ET



A group of computer scientists has found a way to allow robots to adapt to handicaps in much the same way animals and humans do.



Source: Antoine Cully/UPMC

A robot automatically learns to keep walking after damage via a newly invented "Intelligent Trial & Error" algorithm.

If it works, it could mean that less-fragile robots will be better able to work in a wider range of jobs in more treacherous conditions, from building to bomb detection. It also could mark a big step toward creating robots that learn.

Robots have the potential to perform better than human beings at tasks in fields as varied as medicine, manufacturing and even the military. But they lack several key traits of humans and animals, and one of them is the ability to learn how to quickly get back to work when something goes wrong.

[Read More > Good news for America's workers: You matter again](#)

A person who loses the use of an arm can swiftly learn to use the other arm to compensate. A dog that loses a leg can still walk reasonably well on the other three. [\(Tweet This\)](#)

But a broken limb can render a robot completely useless, because most robots do not know how to work around injuries.

# Mortgage Rates Hit Record Lows

[Calculate New Payment](#)



**lendingtree®**

Terms & Conditions apply. NMLS#1136

### MORE FROM CNBC

by Taboola

- [Liar! Three ways to tell if someone is lying](#)
- [Three secrets to the billionaire personality](#)
- [See Cheetah jump! MIT's robot leaps over obstacles](#)
- [This teen wants us all to become part-robot](#)
- [Future office: Where your desk will order your lunch](#)
- [We all lie \(And it's contagious!\)](#)
- [Young women say no to thongs](#)
- [Why do women cheat? Ashley Madison CEO tells all](#)

Pulled over for using Apple Watch? It happened  
Apple Watch debut 'less than spectacular': Analyst

#### FROM THE WEB

Sponsored Links by Taboola



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

NextAdvisor



**Dr. Ron Paul Issues Major Warning For U.S. Seniors**

Stansberry & Associates



**Why Wine is About to Start Tasting Better**

Popdust by Lot18



**Forget The iPhone 6. Next Apple Sensation Leaked**

The Motley Fool

Some current methods used with robots involve running diagnostic tests to figure out what is wrong with a broken robot, which can be time-consuming and may require an engineer. Other methods involve a robot testing which out of every possible behavior might compensate for damage. Since there can be an incredibly large number of actions a robot can take, that method can also take a long time.

So scientists at Pierre and Marie Curie University in France and the University of Wyoming gave a robot the sorts of tools animals use to learn—a range of previous experiences to draw on for understanding, and a way of predicting which behaviors are most likely to work in a given situation.

The team published the results in the journal Nature on Wednesday.

The robots in the study were equipped to run simulations that plotted out the best possible actions they could take to perform a task such as walking. The robots ran the simulations when they were first deployed, so they already had the information on hand. The robots were not simply storing information on all of the possible ways they could walk—they were actually predicting the effectiveness of different styles of walking.

[Read More > Unproductive? Blame sleep, not booze](#)

One six-legged walking robot ranked 13,000 styles of walking based on their effectiveness. Once damaged, the robot was able to begin testing the walking styles it predicted to be most effective, slowly ruling out options until it arrived at the best choice.

That's similar to the kind of knowledge animals have—humans, for example, don't simply try new ways of walking at random. Past experience helps them choose the kinds of gaits that are going to be most comfortable, and quickest. The same goes for just about any action animals perform.

That knowledge about which actions are likely to work best is what separates the team's new method from most of those currently available, according to the researchers. They even refer to it as a "simulated childhood," because it mimics the kinds of memories that enable animals to learn new behaviors.

[Read More > Deadly Texas flooding, in photos](#)

"Once damaged, the robot becomes like a scientist," said lead author Antoine Cully in a press release. "It has prior expectations about



#### TECHNOLOGY



**Uber vs. Carnegie Mellon**

Tech insider Dan Rosensweig thinks Uber's reported poaching of Carnegie Mellon workers is a great thing for all involved.



**How this start-up got an HBO cameo**

Pure Software isn't a household name. After its storage array scored a cameo on HBO's "Silicon Valley," things could get buzzy.



**The future of the financial industry**

XFin conference kicks off



**Windows 10 FINALLY has a release date...**

Microsoft said its new operating system will be available from July 29 and that Windows 7 and 8.1 users can upgrade for free.

#### CNBC NEWSLETTERS

Get the best of CNBC in your inbox

Email (Required)

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. Each behavior it tries is like an experiment and, if one behavior doesn't work, the robot is smart enough to rule out that entire type of behavior and try a new type."

The team was able to get their six-legged robot to walk well again in only a few minutes after two of its six legs were broken.

The researchers said their method is faster and cheaper than many existing techniques because it does not require the robot (or its operator) to diagnose a problem—the robot is only measuring its performance, so it simply figures out what other action will work best as its circumstances change.

[Read More](#) > [White House cautious on genome editing](#)

The team said its research could work for any kind of action a robot takes. They noted, for example, that robots could become far more effective in search-and-rescue missions. A robot damaged by falling debris could still find a new way to function in a situation where time is short and lives are at stake.

But the team hopes its discovery will allow robots to quickly learn how to do anything. [\(Tweet This\)](#)

"Until now, nearly all approaches for having robots learn took many hours, which is why videos of robots doing anything are often extremely sped up," the team wrote in a statement attached to the study. "Watching them learn in real time was excruciating, much like watching grass grow. Now we can see robots learning in real time, much like you would watch a dog or child learn a new skill."



**Robert Ferris**  
Science Reporter



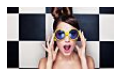
#### MORE FROM CNBC

by Taboola

- [Liar! Three ways to tell if someone is lying](#)
- [Three secrets to the billionaire personality](#)
- [See Cheetah jump! MIT's robot leaps over obstacles](#)
- [This teen wants us all to become part-robot](#)
- [Future office: Where your desk will order your lunch](#)
- [We all lie \(And it's contagious!\)](#)

#### FROM THE WEB

Sponsored Links by Taboola



**5 Credit Cards with No Interest...**

NextAdvisor



**Dr. Ron Paul Issues...**

Stansberry &



**Forget The iPhone 6. Next App...**

The Motley



**Why Wine is About to Start...**

Popdust by



**Hawaii or Thailand, Without...**

CHASE



**7 Tips to Protecting Against...**

Microsoft

SUBMIT

To learn more about how we use your information, please read our [Privacy Policy](#).

#### RE/CODE >



**Kara Swisher**

Co-CEO, Revere Digital; Co-Executive Editor, Re/code; and Co-Executive Producer, The Code Conference. Re/code is part of the CNBC network.



**Walt Mossberg**

Co-CEO, Revere Digital; Co-Executive Editor, Re/code; and Co-Executive Producer, The Code Conference. Re/code is part of the CNBC network.



[See entire Re/code team](#)

#### TECH NEWS FROM RE/CODE >

[Apple Unveils TV Commercials Featuring Video Shot with iPhone 6](#)

[Ellen Pao Plans to Appeal](#)

[Time for Distraction \(Comic\)](#)

[BlackBerry-Typo Settlement Allows iPad Keyboards but Not iPhone Cases](#)

[Google Says 21 Percent of Tech Hires in 2014 Were Women](#)

#### SQUAWK ALLEY >

[Pfizer gaining market share in oncology: CEO](#)

[Star Michelle Phan says YouTube is still relevant](#)

[Facebook's Marcus: Messenger not a payment app](#)

[Xiaomi's Barra on online stores for US and Europe](#)

[Periscope CEO on Android users flooding in](#)

#### MOST POPULAR: TECH



1.

**7 mind-blowing Instagram accounts**



2.

**Trading tech: 5 stocks to buy**

Sponsored

- ▶ [High Dividend Paying Stocks](#)
- ▶ [Fuel Efficient Luxury SUVs](#)
- ▶ [Best 401k Retirement Plans](#)
- ▶ [10 Anti Aging Secrets](#)
- ▶ [2015 Tax Brackets](#)
- ▶ [Compare Bank CD Rates](#)
- ▶ [2015 New Car Deals](#)
- ▶ [Hottest Penny Stocks of 2015](#)
- ▶ [Best Roth IRA Accounts](#)
- ▶ [New Car Buying Guide](#)



3.

[Ellen Pao to appeal result in discrimination suit](#)



4.

[What were the most popular drugs on Silk Road?](#)



5.

[An Al Gore billion-dollar energy bet left standing](#)

CNBC PRO >

[Oil chart shows bear market set to resume](#) PRO

[Beware: Bull market flashing warning signs](#) PRO

[These stocks could deliver 40% gains by end-2016](#) PRO

[Value investor says earnings recession is coming](#) PRO

[Top 5 stocks of the week and how to trade them](#) PRO

Sponsored

1. [High Dividend Paying Stocks](#)
2. [Best 401k Retirement Plans](#)
3. [2015 Tax Brackets](#)
4. [2015 New Car Deals](#)
5. [Best Roth IRA Accounts](#)



[About CNBC](#) [Site Map](#) [Video Reprints](#) [Advertise](#) [Careers](#) [Help](#) [Contact](#) [Corrections](#) [Newsletters](#)

[Privacy Policy](#) [Terms of Service](#) [Independent Programming Report](#) [Latest News Releases](#) [RSS](#)

Data is a real-time snapshot \*Data is delayed at least 15 minutes  
Global Business and Financial News, Stock Quotes, and Market Data and Analysis

© 2015 CNBC LLC. All Rights Reserved.

A Division of **NBCUniversal**

Data also provided by  
 THOMSON REUTERS