

SEARCH

Go > Search Tips

HOME

NEWS

Laptop for poor countries may be sold commercially

Powered ankle could be the next step in prosthesis

Heart scan may harm young women

Security flaw could mean hijacked iPhones

Invention: Rubbery metal

SPECIAL REPORTS

SUBSCRIBE

SEARCH

RSS

PRINT EDITION



- > Current issue
- > Archive
- > **NS** Full Access

NewScientist.com

> Chance and isolation gave humans elegant skulls
17:04 24 July 2007

> Laptop for poor countries may be sold commercially
16:24 24 July 2007

> Tibet is warming at twice global average
14:48 24 July 2007

NewScientistSpace

> Is a second black hole lurking in the Milky Way's heart?
07:04 24 July 2007

> Space station crew dumps trash overboard
21:51 23 July 2007

> Tiny asteroid 'groupie' found trailing after Mars
20:22 23 July 2007

Explore by Subject

- > Health
- > Fundamentals
- > Being Human
- > Living World
- > Opinion
- > Sex and Cloning

Animal-like 'instinct' keeps robot marching

17:07 12 July 2007

NewScientist.com news service
Will Knight

A newly improved two-legged robot can adapt to unfamiliar terrain in an "instinctive" way, by exploiting processes thought to explain how animals move.

The 23-centimetre-tall robot, called Runbot, is little more than a pair of metal legs beneath a few bulky circuits and motors. It marches – and occasionally stumbles – in a circle around Florentin Wörgötter's lab at the University of Göttingen, Germany, attached to a central point by a boom.

Runbot already holds the record for being the fastest robot on two legs (see *Speedy robot legs it to break record*).

Now the latest version of Runbot can also adapt to tricky new terrain, thanks to a "hierarchical control structure". In other words, different levels of control can be called into use when the environmental demands are higher.

At the lowest level, so-called "local circuits" provide the basic control of Runbot's walking motion. These collect data from the robot's joints, which is then used to make adjustments via commands sent back to the joints.

This simple feedback loop keeps the robot marching steadily, providing the terrain beneath its feet remains relatively even.

Trial and error

But it cannot keep Runbot going when it encounters an unfamiliar piece of ground, such as a slope. This can easily cause the robot to become unbalanced and fall (see video, right).

So the researchers have introduced a higher control mechanism to step in. If the robot becomes unbalanced, an infrared sensor causes another computer to override the local circuits and force them to learn through trial and error how to move over the new terrain.

This approach is computationally simple and fast in contrast to the approach many other robots take to walking. Honda's Asimo, for example, has to continually analyse and assess the movement of all of its joints and sensors to calculate its next step – requiring massive computing power.

Hierarchical control is thought to explain how humans and other animals move across different surfaces with relative ease.

Storing parameters

The concept was first put forward in 1930s by the Russian physiologist Nikolai Bernstein. In animals, localised feedback is thought to occur between muscles, nerves and the spinal column, with the brain providing a higher level of control.

However, the mechanisms in animals are much more complex than in Runbot, and other mechanisms also play an important role.

Still, Wörgötter believes it may eventually be possible to mimic this process much more closely. For example, humans can access memories of the key movements they have learned before, but existing robots store little of this.

"But if it comes down to being able to store the parameters in a more permanent way, there's no fundamental reason why you shouldn't do that," he told **New Scientist**.

Journal reference: *PLoS Computational Biology*
(DOI:10.1371/journal.pcbi.0030134)

PRINT SEND **RSS FEEDS** SYNDICATE



- > For exclusive news and expert analysis every week subscribe to **New Scientist Print Edition**
- > For what's in New Scientist magazine this week see contents
- > Search all stories
- > Contact us about this story
- > Sign up for our free newsletter

PRINT SEND **RSS FEEDS** SYNDICATE



Runbot exploits processes thought to explain the way animals control locomotion (Image: Florentin Wörgötter/PLOS)

[Watch the full-size video](#)

Tools



Related Articles

[Speedy robot legs it to break record](#)
05 April 2006

[Rambling robots show human efficiency](#)
17 February 2005

[Organised chaos gets robots going](#)
01 November 2004

[Search New Scientist](#)

[Contact us](#)

Web Links

[Florentin Wörgötter, University of Göttingen](#)

[PLoS Computational Biology](#)

Sign up for New Scientist's FREE email newsletter here

Subscriber Login

username:

password:

Your login is case-sensitive

Log in > Help

- > Forgotten your password?
- > Subscriber? Register now!
- > Subscribe now
- > Institutional Subscribers
- > Athens login

Subscriptions

Save 10% and get 4 free extra issues



NewScientist

- > Subscribe
- > Renew
- > Change address
- > Free E-Zine
- > RSS

Subscribe to **NewScientist**
Get 4 free extra issues and unlimited online access



GO

NewScientist