

Cornell's Ranger Robot Breaks New Walking Record

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Ranger, a four legged bi-pedal robot, set an unofficial record at Cornell last month for walking 23 kilometers (14.3 miles), untethered, in 10 hours and 40 minutes. Walking at an average pace of 2.1 km/h (1.3 miles per hour), Ranger circled the indoor track at Cornell's Barton Hall 108.5 times, taking 65,185 steps before it had to stop and recharge. Ranger walks much like a human, using gravity and momentum to help swing its legs forward, though its looks like a boom box on stilts. Its swinging gait is like a human on crutches since the robot has no knees, and its two exterior legs are connected at the top and its two interior legs are connected at the bottom.

Engineering students at Cornell's Biorobotics and Locomotion Laboratory stayed up all night on Tuesday, July 6th, 2010 while their professor Andy Ruina cheered them on over Skype. Jason Cortell, a research engineer specializing in electronics and the lab's manager, steered Ranger using a remote control. He walked for most of the 11 hours but was carted around when he felt tired, controlling the robot all the same. "When he had to take a bathroom break, he made a run for it while Ranger was on a straightaway," says Ruina.

This is a competitive milestone for the lab after (unofficially) competing for the record with Boston Dynamics' BigDog over the past two years. The original record was set by Ruina's lab in April 2008 when Ranger walked 9 km (5.6 miles) around Barton Hall. The record was subsequently broken by Boston Dynamics' BigDog when it walked 20.6 km (12.8 miles). "Ranger competing with BigDog is like Bambi meets Godzilla," says Ruina. "While DARPA funds Boston Dynamics with tens of millions of dollars a year, we've probably received a total funding of 1 million over many years." Most of Ruina's lab's funding comes from the NSF's Robust Intelligence program.

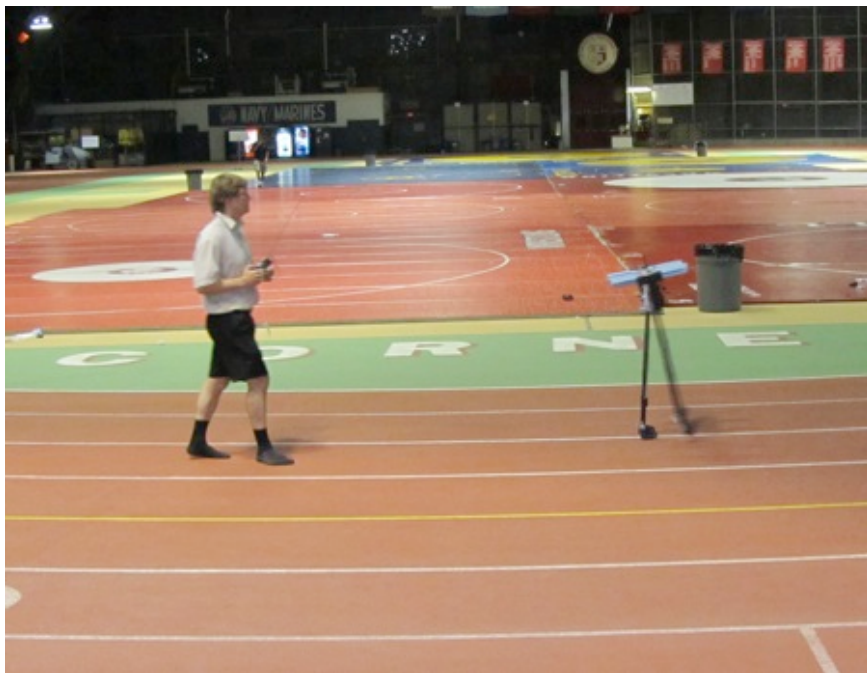
"I don't anticipate bi-pedal robots being necessarily important in the world of engineering," says Ruina. "What fascinates me is the scientific aspect of bi-pedal robots. It's an indirect way to understand human beings. By studying the legs,

joints, and length ratios we appreciate the beauty of nature's design."

But the overall task of the project isn't to reverse engineer a human being -- it is a study of electrical efficiency and their goal is to figure out how to build a robot that moves as efficiently as a human. "Human beings are robust and energy stingy," explains Ruina. "We are trying to get a robot to be as reliable as a human being. If Ranger walks 14 miles, he uses 3 cents of electricity, which is more than twice as much as a human of equal weight would have used for the same distance." The data could have an impact on biological research for rehabilitation, prosthetics for humans, and improving athletic performance.

What's up next for Ranger? The lab aims to have Ranger walk 30 to 80 km (about 20 to 50 miles), while continuing to cut back on energy consumption. Ruina also wants to see Ranger on an outdoor track with solar cells on top of its head. "Ranger would stop when it gets tired," he explains. "Then wait for the sun to charge him back up so he could go, go go!"

Here's a video report from IDG and more photos:





Images: Biorobotics and Locomotion Laboratory/Cornell University