

Wii bit of fun at Rice University has serious intent

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Why are some people fast learners? Can we teach everybody to be like them? Yes, Wii can. A Rice University research project recently funded by the National Science Foundation is making use of Nintendo's popular video game technology to codify learning systems in ways that can be used in a range of human endeavors, from sports to surgery.

Two Rice professors, Marcia O'Malley and Michael Byrne, are following up on O'Malley's pioneering work using robots to treat stroke victims with a study to map out how people learn physical tasks, with the ultimate goal of programming robots to teach in new ways.

With the new NSF grant, O'Malley and Byrne will spend the next three years measuring the motions involved in tasks as mundane as playing paddleball and as complex as flying a fighter jet.

To do that, having a motion-capture device at hand will be invaluable, said O'Malley. The device is called an accelerometer, but video game fans know it as a Wiimote, the handheld wand that serves as a wireless interface between player and screen.

Video clip is available online at:

www.rice.edu/nationalmedia/multimedia/Wii.avi

"It's the only part of the system we really need," said O'Malley, director of Rice's Mechatronics and Haptic Interfaces Laboratory. Byrne said they'll compare data from the Wiimote to that from a more expensive

Vicon motion capture system to "see how good the Wii really is."

"We're already grabbing motion data from the Wiimote," said O'Malley, "so soon we'll be able to measure a range of motion and then turn it into a mathematical model."

For the researchers, here's where the games really begin. Their ultimate plan is to bring together robotics and virtual reality in a way that lets people absorb information through repetition of the motor pathways.

Think of hitting a tennis ball. Learning by trial-and-error is fine, but it would be much easier if a robotic sleeve could tell you exactly where that hitch in your swing is and gently prod you to hit the ball correctly.

"Using the Wii will be a great way to recruit subjects," said O'Malley. "We can say, 'Hey, kids, come play some games!'"

Their research into what they term the "cognitive modeling of human motor skill acquisition" will focus on three types of learners. "There are experts who learn at a slow, steady pace, but they get there," she said. "There are novices, who learn at a slow, steady pace, but sometimes they never get there. And then there are those who start off awful, but somewhere in the middle of training they suddenly 'get it.'"

"What will be interesting is, can we get this last group to 'get it' and become people who learn very quickly by honing in on the right cues? And can we get these people who learn very quickly to improve even faster? We're interested in how these groups of performers differentiate, and if there are inherent characteristics of movement and control policies that lead to expertise. To find out, we need data," O'Malley said.

Here's where Byrne's expertise comes in. An associate professor of psychology who specializes in computer-human interaction, he'll analyze

feedback on the range of motion used in performing a task and figure out precisely where the most efficient learning happens.

"I work with the sort of mathematical computational theory of human performance that's never been extended to the kind of dense motor activity we want to study," said Byrne. "There's just not a lot of good data out there."

O'Malley and Byrne have been brainstorming about the kind of data they want to collect. "We're starting with a bunch of Wii games," said Byrne. "We find that some games have really good learning properties we can measure, and there are also some that people don't seem to get a lot better at."

"I can tell you I'm about as bad at Wii golf now as I was when I started playing it."

Source: Rice University

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