Making animated characters jump just got easier

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Credit: Disney Research

The way a videogame character jumps, kicks, walks, runs or even breathes is determined by a loop of frames known as a motion cycle. Also critical for producing animated films, motion cycles are as important as they are difficult to create. But an innovative new tool from Disney Research can make the task much easier.

Disney Research has developed an authoring tool for motion cycles that enables novices to rapidly create a motion cycle and enhances the workflow for expert animators. Starting with input from a computer mouse or even a full-body motion capture suit, the software can automatically extract the looping cycle and allow the user to edit the motion as desired.

"Until now, authoring of motion cycles has relied on general-purpose

animation packages with complex interfaces that require expert training," said Robert W. Sumner, associate director of Disney Research. "With our software tool, however, high-quality motion cycles can be produced in a matter of minutes, making the process faster and more efficient for experts and non-experts alike."

The research team will present their authoring tool at SCA 2017, the ACM SIGGRAPH/Eurographics Symposium on Computer Animation July 28 in Los Angeles.

"The way a character walks or makes other repetitive motions is part of character development in animated features," said Markus Gross, vice president at Disney Research. "The resulting motion cycle provides a starting point throughout production for a variety of cyclic movements. By making it easier to author these loops, our research team is enhancing the creative process and expanding the variety of artists who can contribute to the process."

Martin Guay, a post-doctoral researcher at Disney Research, said the new system includes several innovations - an algorithm that can extract the motion cycle from a performance, a manipulation tool called MoCurves that allows editing both the shape and timing of the motion directly on the character, rather than through indirect editors, and finally, a means for controlling a character's contacts with the ground and other surfaces.

"These building blocks have been designed around the observation that key-framing - the de-facto approach in animation—can make it hard to create certain types of coordinated movements" Guay said. "The animation toolset has not evolved much over the past decades, and we tend to see the same styles of movements over and over again. Performance animation, which allow animators to use hand gestures to animate, has the potential to unlock a whole new set of styles in

reasonable times, and that we as an audience, get to enjoy."

Input is possible by using a computer mouse to specify the motion, but the system also accommodates users who would rather act out the motion using motion capture or other technology. The user can act out the entire motion, or can act out different elements of the motion in a layered fashion.

As part of the system's evaluation, the researchers invited five novices to use the software to develop motion cycles. Each was given an hour to author a cycle and the results were impressive, said Loïc Ciccone, a Disney Research lab associate and a Ph.D. student at ETH Zurich.

"This part of the study also was a social success, as the users were enchanted to be able to animate a character," Ciccone added. "Several said 'This was the most enjoyable user study of my life.'"

More information: "Authoring Motion Cycles-Paper" [PDF, 15.41 MB]

Provided by Disney Research