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Contour mapping intricate detail

Mova revolutionizing motion-capture process with new system

By Chris Marlowe

Contour, a new cinematography process from the Mova motion-capture studio, claims to capture and depict full-motion, photorealistic, computer-generated characters and other imagery more accurately and at lower costs than before possible. This will be put to the test in October, when director David Fincher and Digital Domain will begin using Contour on "The Curious Case of Benjamin Button."

The Contour Reality Capture System eliminates the need for motion-capture's typical body suits and shiny dots. Instead, it uses two separate but carefully synchronized camera systems to simultaneously record visual and geometric information. Impressive mathematics merges the two sets of data together to create a high-resolution 3-D digital image.

"Contour's promise is enormous," Fincher said. "The notion that the human face in all its subtleties could be mapped in real time and with such density of surface information opens up so many possibilities for both two- and three-dimensional image makers and storytellers."

Mova founder and president Steve Perlman demonstrated how phosphorescent makeup is applied before cosmetic or other makeup. One camera sees only this base, while the other films what humans see. The resulting data captures even the tiny movements around mouths and eyes, tricky areas that must be approximated in existing motion-capture techniques, at up to 120 frames per second and a resolution of more than 100,000 polygons per frame. Fabrics also can be treated to be phosphorescent.

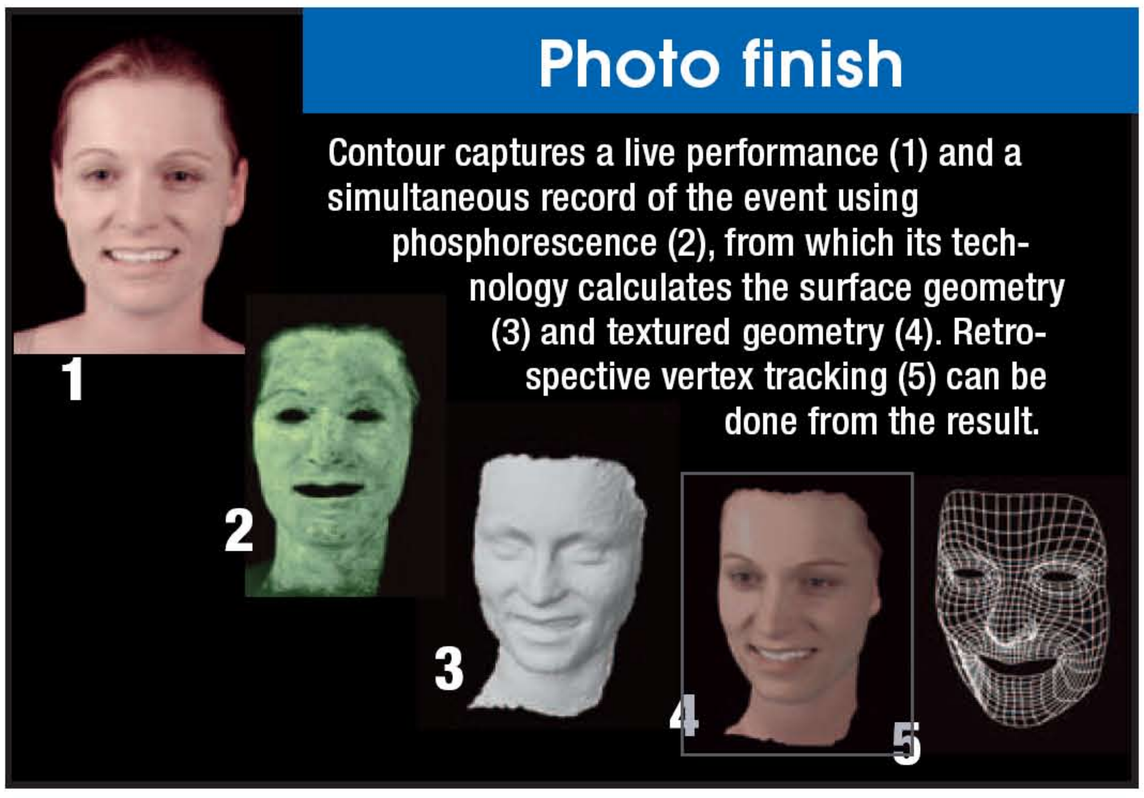
"Contour lets us move from conventional point-of-view cinematography to true volumetric cinematography, where scenes are captured in the round," Perlman said. "Instead of capturing viewpoints and making something realistic out of them by hand, we can capture the reality."

The application allows actors to give a more natural and authentic performance than marker systems do, he said. Perlman added that the digital representation also can be imported, modified, manipulated or retargeted to other characters using standard CGI animation software.

Ed Ulbrich, senior vp and executive producer at Digital Domain, described Contour as a genuine breakthrough in digital effects production.

"I live in this environment, and I see stuff every day, so I get a little jaded," said Ulbrich, whose credits include visual effects Academy Award winner "Titanic." "Other developments have been gradual, more evolutionary than revolutionary. Contour separates the performance from the photography. It's a substantial turning point in the business, and I think it will change how pictures are made."

Digital Domain has not yet used it on a production, and Ulbrich said it still has some kinks to be worked out before it can be a standard tool.



"This could change everything and open up a whole new world of creative possibilities for directors," Ulbrich said.

Through collaboration between the two companies, Contour's markerless capture system was designed to be used simultaneously with the Vicon MX-series marker-based capture system. This makes it possible for Contour's cameras to capture high-resolution surface motion, such as facial, skin and cloth motion, while the Vicon MX40 cameras capture high-precision marker motion, such as skeletal and prop motion.

"We've seen brilliance like in the character of Gollum, and we've all used certain levels of mo-cap for what I call digital stunts — putting the head of the star on the stunt actor — but what we haven't seen in a photoreal way is a noneffect," Ulbrich said. "A person having a dialogue scene and no one's aware that it's CG, for instance. There are many practical applications for Contour. This is not science fiction, this is real."

Contour also collaborated with graphics processing specialist nVidia. NVidia general manager of professional products Jeff Brown said that the technology was used to accelerate the capture rather than its usual function of accelerating rendering and display.

"Impossible shots become viable," Perlman said. "It's also dramatically less expensive and requires very little digital cleanup."

San Francisco-based Mova was founded in 2004 by Rearden Inc., which Perlman also founded. He was involved with the development of multimedia while at Apple Computer and later founded WebTV Networks, which was acquired by Microsoft in 1997 for about $500 million. ■