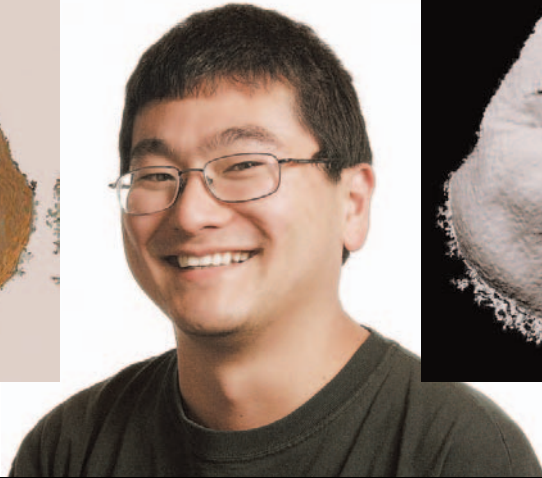


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MOVA  
In the Mova process, fluorescent child's makeup is applied to a person's face — such as this writer's. A hundred thousand images are captured with 44 cameras, then synthesized into a single 3-D computer model artists can manipulate.

## SAVING FACE

MOVA CLOSES IN ON REALITY IN DIGITAL IMAGING, HOPING TO MAKE THE PROCESS SO EASY THAT ANIMATORS — AND SOMEDAY CONSUMERS — CAN JUST CREATE

**By Dean Takahashi**  
*Mercury News*

When it comes to creating realistic characters in video games, computer artists have made brilliant replicas but they still struggle with the last frontier: making a human face that acts like the real thing.

The gap between what players see on the screen, and what they expect, is sometimes called “the uncanny valley.” The subtleties of what makes faces appear human still confounds artists trying to replicate it in digital form.

Silicon Valley entrepreneur Steve Perlman believes his latest start-up, San Francisco-based Mova, has the answer. Paradoxically, he acknowledges that the closer artists get to making a precise digital replica of a face, the more weird it can appear if it doesn't move as if it were human.

“As we get close to real, it looks even worse,” said Steve Perlman, founder and president of Mova.

Artists have made huge strides making video games and movies simulate reality, diminishing the “uncanny val-

ley” first described by Japanese robot-maker Masahori Mori in 1970. Mori observed that the more inventors tried to create a realistic human-like robot, the more artificial it looked.

Four years ago, Perlman anticipated that the last frontier for computer artists would be human faces. With a small team, he created Contour, a tool that combines the images from 44 cameras into a three-dimensional image of a person's face that can be digitally manipulated without painstaking touch-up work. Now video game characters won't seem so fake when game players have conversations with them.

Perlman hopes Mova's process can replace the clumsy practice known as “motion capture.” In that process, artists attach about 20 reflective balls to a person's body or face, then capture the light reflections off those balls and reconstruct them in a computer model. That provides skeletal movement information that produces realistic moving characters.

But that method is still too crude for capturing an arched eyebrow or sly smile — the subtle facial movements

that rely on soft body tissue.

Mova hopes to make the process of converting real-life images into digital form so easy that artists will be able to spend more time being creative, Perlman says. One day, he hopes that consumers themselves will be able to use the technology to create their own lifelike computer animations.

“Contour takes us from motion capture to reality capture,” said Perlman.

If it works, Perlman says, Mova will help animators and game creators save millions in production costs and be far more productive.

“Anything that simplifies the process and lets the artists be artists is welcome,” said Don Daglow, president of game developer Stormfront Studios in San Rafael and one of Mova's customers. “If you get faces almost right and not quite right, the penalty is awful. Consumers will laugh at it or grimace.

He added, “If anybody cracks that nut, game companies will use it.”

The problem of animating human faces is getting harder because the latest video game consoles — the Xbox 360 today and the PlayStation 3 coming



The key to Mova's technology is makeup. Mova employees sponge fluorescent child's makeup on the real person's face.

They then use 44 cameras to capture reflective points on the face as the person smiles or frowns. Mova then synchronizes the images and synthesizes them into a single "wire frame."

The artists can then take that computer model, shade it with the right colors, and use it in their animated film or game. The details are accurate to a tenth of a millimeter.

this fall — are being hyped for their ability to render graphics with high-definition details. Consumers expect far better quality when it comes to lifelike characters in games, Daglow said.

The key to Perlman's technology is makeup. Instead of attaching balls to someone's face, Perlman's employees sponge fluorescent child's makeup on the real person's face. They then use 44 light-sensitive cameras to capture a hundred thousand reflective points on the face as the person smiles or frowns.

Then, using imaging software and a rack of computing hardware, Mova synchronizes the different images from the 44 cameras and synthesizes them into a single "wire frame," or a 3-D computer model that becomes the underlying skeleton of a computerized face. The artists can then take that computer model, shade it with the right colors, and use it in their animated film or game. The details are accurate to a tenth of a millimeter.

Perlman estimates this process is a hundred times cheaper than conventional means, and the quality of the animated faces better. What's more, it takes less than 24 hours to create, compared to the typical six to eight week period otherwise.

"Contour's promise is enormous," says David Fincher, director of the film "Fight Club." Since Contour relies on

taking photos of real people, some might find it eerie to discover that their own faces can be perfectly animated and manipulated to say things they never said. But Perlman notes that subjects have to willingly participate in the Contour process, so the prospect of a new kind of identity theft — call it facial theft — is slim.

products in the fall.

A serial entrepreneur, Perlman started WebTV Networks to create appliances that could surf the Web. Microsoft bought the company in 1997 for \$425 million.

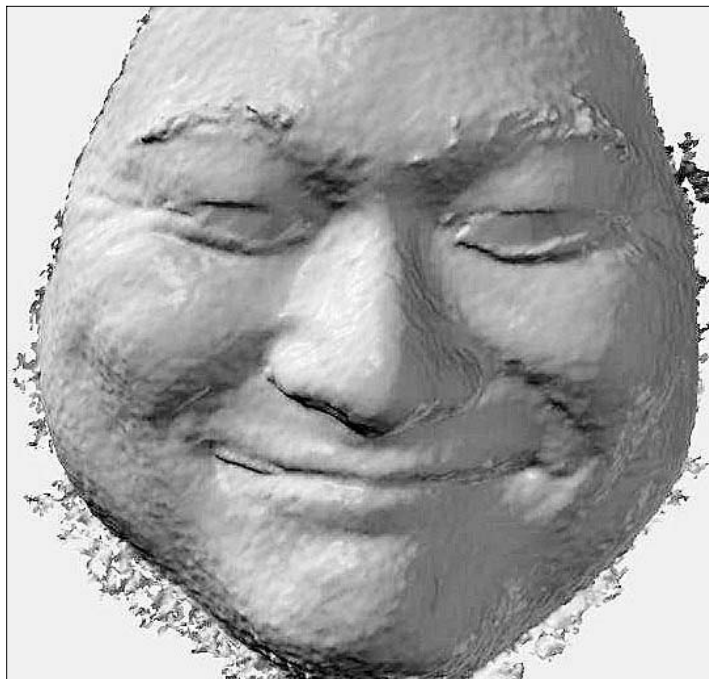
Then Perlman founded Moxi Digital, a maker of digital set-top boxes for cable TV companies. It raised \$67 million in venture capital but was acquired in 2002 by Microsoft co-founder Paul Allen's Digeo after it ran into trouble winning over customers.

Meanwhile, in 2000, Perlman formed his own venture firm, Rearden Companies, to provide funding for promising new technologies. Perlman himself began work on the Contour technology for Mova, often for 18 hours a day. Now Perlman says the technology for automating the capture of faces is ready. Three customers — two game companies, one film company — are already using Contour on major productions.

Daglow looks forward to assessing Contour. Even

Perlman acknowledges Mova's current technology still can't solve some other problems, like depicting long, flowing human hair.

"Realism is going to get steadily better, but I don't know if we're ever going to reach nirvana on it," he said.



Contour is a tool that turns the images from many cameras into a three-dimensional image of a person's face that artists can digitally manipulate without painstaking touch-up work.

Mova already has close ties to game and film makers. For the past two years, Mova has been providing conventional motion-capture services to video game companies and movie makers. Now it will start seeding customers with the Contour tool and ship finished