Firsthand Technology

Helps doctors reduce burn victims' pain with 3DVIA Virtools

Overview

Challenge

Doctors at the University of Washington School of Medicine needed a more flexible version of SnowWorld, a virtual reality approach to relieving burn patients' pain by distracting them during wound treatment.

Solution

Commissioned by the University of Washington, Firsthand Technology leveraged 3DVIA Virtools and NVIDIA graphics to create a version of SnowWorld that is even more immersive and can be changed and updated easily.

Benefits

Patients report their perception of pain when immersed in SnowWorld is reduced by as much as half. 3DVIA Virtools allows Firsthand Technology to quickly and easily adapt SnowWorld to test researchers' new hypotheses in burn pain therapy, further improving treatment.

"3DVIA Virtools allows us to create a diverse range of applications for the widely varied needs of our customers."

Howard Rose, Founder and President, Firsthand Technology

Firsthand

Making technology work for people

Burn patients must endure both their initial injuries and the excruciating wound care treatments that follow. But pain experts at the University of Washington Schools of Medicine and Engineering are using a 3D virtual reality (VR) application called SnowWorld, developed by doctors and built by Firsthand Technology in 3DVIA Virtools and running on NVIDIA graphics solutions, to distract patients from their pain. In many cases, patients experience not just a lowered perception of pain, but as much as a 50% reduction in pain-related brain activity, as documented by brain scans.

University of Washington's Dr. Hunter Hoffman, a virtual reality researcher, and Dr. Dave Patterson, a pain and hypnosis expert, created the first version of the environment they call SnowWorld in 1998 using video game technology. Initially developed with funding from Microsoft co-founder Paul G. Allen and the National Institutes of Health, SnowWorld whisks burn patients away to an icy canyon where snowflakes fall and patients can shoot snowballs at snowmen and other targets.

"The immersive nature of SnowWorld is what makes it so effective," Hoffman says. "Wound care sessions are the only time patients get to see their burns. Watching the nurse work on their open burn wounds doesn't make for a positive experience, especially for children. Immersing themselves in SnowWorld draws patients' minds away from the pain and blocks their view of the real world for a while."

Although initial success with SnowWorld was impressive, researchers predicted that a more immersive environment would yield higher degrees of pain relief. So Hoffman and Patterson turned to University of Washington colleagues Howard Rose and Ari Hollander, then part of the university's Human Interface Technology (HIT) lab, for assistance.

Hollander, an expert in 3D immersion technology, and Rose, a designer of virtual environments, formed Firsthand Technology with a mission of "making technology work for people." The company, which also develops applications ranging from treatment of post-traumatic stress disorder to medical training applications, optimizes software

DASSAULT SYSTEMES

interfaces to extend the impact of factors such as sound, touch and visuals in VR environments.

Flexibility for change

"We rebuilt SnowWorld with 3DVIA Virtools from Dassault Systèmes to make it simpler to modify," Hollander says. "The flexibility of 3DVIA Virtools allows SnowWorld's creators to more easily test different experimental hypotheses and identify factors relevant to better pain control."

With 3DVIA Virtools, Hollander says, developers can easily manipulate what they already have. "Dr. Hoffman wanted us to alter the field of view, for instance. That would have taken significant time on other platforms. But with 3DVIA Virtools, we can fine-tune quickly and easily."

"3DVIA Virtools is versatile enough to let us explore a variety of options without investing so much time and effort testing out an idea that we feel locked into keeping the change regardless of its usefulness," Dr. Hoffman confirms. "Virtools has become an integral part of our research team's success"

Simply powerful

The fact that 3DVIA Virtools is easy for non-programmers to use is one of its biggest advantages, Rose says. "I can put my ideas directly into practice. Rather than relying on a team of programmers, a small, nimble development team can achieve a lot with 3DVIA Virtools. Firsthand is a small company, and Virtools allows us to create a diverse range of applications for the widely varied needs of our customers."

3DVIA Virtools' rendering capabilities, which allow designers to create dynamic shader effects and character animation in real-time on NVIDIA graphics solutions, set it apart from similarly priced VR solutions. "The cost-to-performance ratio and ease of use of 3DVIA Virtools are key factors," Rose says. "3DVIA Virtools allows us to employ particles, shaders and sophisticated textures to deliver a highly attention-grabbing experience. We prefer the professional-quality NVIDIA Quadro solution for our development environment, and the Geforce cards targeted to the consumer market enable us to deploy SnowWorld more affordably in hospitals."

"In the 3DVIA Virtools version of SnowWorld, the snowflakes are just incredible," Dr. Hoffman says. "The magical 3D snowflakes help patients feel 'there' in SnowWorld, which leads to greater pain relief. The software takes full advantage of the faster computers available today and really adds a lot of 3D depth. It is also much simpler to install and start using."

Programming speed is another key advantage. "3DVIA Virtools' built-in functionality and flexibility facilitate rapid prototyping," Hollander says. "Our clients appreciate that they can see their concepts evolve quickly, which enhances the collaborative design process and the client's satisfaction with the final product."

Focus on **NVIDIA**

Firsthand Technology uses a range of graphics solutions from DS technology partner NVIDIA, the world leader in visual computing tools. Firsthand selected NVIDIA solutions for their high-performance rendering and physical simulation capabilities when creating content, and their flexibility for different markets.

"Immersing themselves in SnowWorld draws patients' minds away from the pain and blocks their view of the real world for a while. 3DVIA Virtools has become an integral part of our research team's success."

Dr. Hunter Hoffman, Director of the VR Analgesia Research Center, University of Washington Schools of Medicine and Engineering

Dassault Systèmes
10, rue Marcel Dassault
78140 Vélizy-Villacoublay, France
Tel: +33 (0) 1 61 62 61 62

For more information or to contact a sales representative, visit www.3ds.com/contacts

For more information on Firsthand Technology, visit www.firsthand.com

For more information on the University of Washington Schools of Medicine and Engineering, visit http://uwmedicine.washington.edu or www.vrpain.com

For more information on NVIDIA, visit www.nvidia.com