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- HELP & HOW TO
- ENTERTAINMENT
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- Video
- Shopping

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Ultimate Home Entertainment

Find out why 'immersive' technologies could change couch potatoes forever, Thursday 3/7 at 9 p.m. Eastern on 'Tech Live.'

By Jim Goldman, Tech Live Silicon Valley bureau chief
March 7, 2002

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Immersive video and audio technologies are revolutionizing the electronic entertainment experience.

Researchers at the University of Southern California's [Integrated Media Systems Center](#) in Los Angeles have made major advances in how we watch and hear television, movies, music, and more.

USC student Thomas Pintaric has written some of the most influential scientific papers on the topic. As he speaks, he wears a head-mounted video display and watches a filmed event in 360 degrees.

"So when I'm looking left, I see what's been filmed on the left... when I'm looking right, I see what's been filmed on the right. I'm immersed in a video environment," Pintaric said.

Pintaric controls what he sees merely by moving his head. He can even turn around and see what is behind him.

Shooting the video with a panoramic camera that houses five separate cameras and mirrors creates the effect. After the filming is complete, a new software algorithm developed by the USC team stitches together all the angles into a single, seamless experience.

"We call that 'immersion.' Looking at a flat screen doesn't give you the sense of presence. But we... make it feel like you were there at the time of recording," Pintaric said.

And video is only half the story.

Superior audio

Another engineer, working with the same team that created THX sound, has developed new, extraordinary audio capabilities. The standard today in home theater, cinema, and DVD is something called 5.1 audio. This new technology is so powerful, it could be called "10.2."

During a demonstration in a darkened studio, an engineer plays back what sounds like a Ping-Pong game. The crystal-clear sound seems to fill the room. Close your eyes, and it seems as if the game is not merely being played right in front of you, but all around you.



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"We've spent a lot of time learning how the human ear perceives sound from different directions and how to simulate that using digital signal processing," said Chris Kyriakakis, an assistant professor at USC's School of Engineering.

But the true value in this technology is how easily that sound quality can be recreated.

First, engineers electronically and acoustically map a given location using a series of 16 microphones. Just about any location can be used, whether it is a large symphony hall, an outdoor amphitheater, or a small recording studio.

Once the "map" is created, any piece of music can be played through the software and made to sound as if it was originally recorded in the mapped location. For example, engineers can take a Frank Sinatra tune that was recorded in a small studio and make it sound as if it were recorded in Carnegie Hall.

"We can create the equivalent of virtual images... with sound," Kyriakakis said.

If you had the acoustic modeling software on your home PC, you could transform low-quality streaming audio into rich, vibrant sound.

"If you have enough processing power, it can be done in real time," Kyriakakis said.

Treating mental illness

One clinical psychologist wants to apply these evolving technologies to patient treatments.

"It was the ideal match [between] the capabilities of the technology... and the needs of the clinical applications," said Albert "Skip" Rizzo, a clinical psychologist working with USC.

Rizzo said he believes immersive audio and video innovations create much more realistic environments than traditional virtual reality. This advance could create a far more effective tool for treating ailments like attention deficit disorders and social phobias, Rizzo said.

"I think it represents a possible paradigm shift in how psychology will be done in the future," he said.

For now, these technologies remain in the research and development stage and are not yet ready for consumers.

"Tech Live" airs weekdays at 9 a.m., 4 p.m., 9 p.m., and 12 a.m. Eastern.

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