

Virtual reality gets real

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Creating close to real-life virtual reality (VR) experiences has proven to be costly and has had rather poor results. In response, a European research team has explored how exploiting visual and auditory illusions can possibly lead to low-cost virtual reality simulators of the future.

Nowadays virtual reality is used within a wide range of areas such as medicine and the car manufacturing industry. However, due to problems with cost and quality, the technology has not yet reached a wider market.

Instead of trying to simulate the sense of the person's motion by physically moving the person, which often causes motion sickness, the Swedish-German POEMS project, used a perceptually-oriented approach towards self-motion simulation. Thanks to funding under the European Commission's Future and Emerging Technologies initiative of the IST programme, their work and findings resulted in a simulator

prototype, presented at the 8th International Presence Conference, held in London 2005.

At the event a group of 20 participants tested the prototype simulating the market place in Tübingen, Germany. Although seated, with headphones and a screen in front of them, participants got the distinct feeling of moving as the image on the screen in front of them turned around the square.

Basically the simulator exploits avection illusion of the brain, which makes us believe we are moving when actually we are stationary. The same can be experienced, for instance, when you are stopped at a traffic light in your car and the car next to you edges forward. Your brain interprets this peripheral visual information as though you are moving backwards.

To enhance the illusion and achieve a higher perceptual realism, acoustics was added to the visual impression. Stationary audio sources, like a fountain and church bells, shifted from ear to ear when performing the virtual turn around the square, strengthening the feeling of movement, Dr Pontus Larsson from Chalmers University in Gothenburg, Sweden explains.

“For the acoustics we found that realistic sounds are more effective than synthetic [sounds] and likewise stationary sources, such as church bells, are more effective than moving sources such as the sound of a car,” Larsson says.

“One of the findings in testing the simulator was that participants experienced a slight delay in motion. We are now working on reducing this to zero,” explains Dr Bernhard Riecke, the POEMS project coordinator for the Max Planck Institute for Biological Cybernetics. “None of the participants in the test, however, reported any motion

sickness and even in other tests we have not registered any discomfort.”

Using sensory illusions in virtual reality proved successful in creating a state of presence and motion as well as being cost-effective and efficient, Riecke explains. It competes well with more expensive simulators using motion-platforms, which from earlier research have shown not to significantly add to the experience of motion.

Although the simulator built by POEMS is a proof-of-concept only and further research is needed, since it ended in December 2005, the project has engaged in further developments towards what in the end could become a commercial product.

“We are currently trying to get new partners into the boat and are negotiating with people from The Netherlands, Britain and Germany,” he says. The aim is to build on the findings from POEMS and develop a prototype that includes physical motion. Riecke envisages that such a low-cost simulator, in the future, would allow wider use in the gaming and entertainment industry as well as architectural markets.

Source: [IST Results](#)

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