УДК 004.451:811.111

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Virtual Reality

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Анотація

Стаття присвячена сучасній технології віртуальної реальності, яка активно поширюється в різних галузях суспільної діяльності та має великі перспективи розвитку. Також проаналізовано чинники, що стали «фоном» появи технології, досліджено сфери застосування, шляхи використання та принципи роботи.

Ключові слова: віртуальна реальність, технологія, ефект присутності, інформаційні технології.
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Abstract

The article is dedicated to the modern technology of virtual reality, which becomes more and more widespread nowadays and promises to develop in the nearest decades. The background of appearing of the technology, fields of application and ways of using and detailed analysis of performing are mentioned.

Keywords: virtual reality, technology, IT, telepresence, haptic systems.

Virtual Reality is a great marvelous world that allows everybody who's touching it to dive into the fantastic creatures of human's mind. You can be a robot and live on Mars, for example, or become a giant and live in the Lilliput Country. There is a line of systems that are used for this purpose, such as headsets, omni-directional treadmills and special gloves. These are useful for stimulating our feeling and senses together to create the delusion of reality. It's really hard task as our senses and brains are evolved to insure us with a perfectly synchronized experience. Therefore, games with people's mind are very specific and of fine job. If something is even a little out of the general picture, we feel it at once. There are several terms such as immersiveness and realism, which help professionals in the "imitation game". These issues that divide convincing or enjoyable virtual reality experiences from jarring or unpleasant ones are both technical and conceptual. The virtual reality technology must take human's physiology into consideration. Human visual field does not look like a video frame. We have approximately 180 degrees of vision and although you are not always knowingly aware of your peripheral vision, if it were gone you'd see. And it's just the one nuance among many of them. The set of hardware, software and sensory synchronicity works in the real time and makes it possible to achieve something like a sense of presence. The multi-channel speaker system localizes the sound source allowing the user to navigate the virtual world with the help of hearing. Simulation of tactile or haptic sensation has found its application in virtual reality systems. This so-called closed-loop device, which is used for solving problems of virtual prototyping and ergonomic design, the creation of various simulators such as medical simulators, remote control robots, including micro- and nano-systems of virtual sculptures creating. [1]

In order to make the most accurate recreating of the user's contact with the environment the user's interfaces are used, the most realistic simulates are racing wheel with pedals, handles device control, sighting a gun and so on. Virtual reality gloves and hand movements tracking carried out with the help of video cameras are used for contactless object control. The latter is typically implemented in a small area and does not require any additional equipment. Gloves of virtual reality may be part of a virtual reality suit, tracking change in the position of the whole body and also transmitting tactile, thermal and vibratory sensation. A device for tracking user's movements may be a freely rotatable ball, where the user is put, or carried out only with the help of suspended in air or immersed in a liquid of a virtual reality suit. Technical facilities are also being developed to simulate odors. The device described above affects the human senses but the data can be transmitted directly to nerve endings, and even directly into the brain through the brain interface. This technology is used in medicine for replacing lost sensory abilities but it is too expensive for everyday use, and does not reach the quality of the data that is acceptable for the transmission of virtual reality. On the same principle various instruments of physiotherapy and devices that reproduce the feeling of the real world in an altered state of consciousness are based.

Virtual reality imitates actions as well as reactions. Objects of virtual reality conduct close to behavior of analogical objects of the material world. User can affect them according to the physical laws. However, often developers allow users even more than it is possible in real life to entertain them better. [2]

The combination of a sense of immersion and interactivity is called telepresence. Two main components of immersion are the depth of information and the breadth of information. The depth of information refers to the amount and quality of data in the signals a user receives when interacting in a virtual environment. For the user, this could refer to a display's resolution, the complexity of the environment's graphics, the sophistication of the system's audio output, etc. Scientists define the breadth of information as the "number of sensory dimensions simultaneously presented." A virtual environment experience has a wide breadth of information if it stimulates all your senses. Most virtual environment experiences prioritize visual and audio components over other sensory-stimulating factors but a growing number of scientists and engineers are looking for ways to incorporate user senses of touch. Systems that give a user force feedback and touch interaction are called haptic systems.

NASA, the Department of Defense and the National Science Foundation funded many researches and developments for virtual reality projects. The CIA contributed \$80,000 in research to Sutherland. Early applications mainly fell into the vehicle simulator category and were used in training exercises. Because the flight experiences in simulators were similar but not identical to real flights, the military, NASA, and airlines instituted policies require pilots not to have a significant lag time (at least one day) between a simulated flight and a real flight.

For years, VR technology has remained out of the public eye. Almost all developments had focused on vehicle simulations until the 1980s. Then in 1984, a computer scientist named Michael McGreevy began to experiment with VR technology as a way to advance human-computer interface (HCI) designs. HCI still plays a big role in VR research, and moreover it leads to the media picked up on the idea of VR a few years later. [3]

Now virtual reality is used in education, media, building industry (architecture), media, computer games, engineering, arts, sports and even medicine. It has big future but it is crucially important to remember that virtual reality can't replace "real" reality.

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