Арсенюк Д.В.

Virtual Reality

Вінницький національний технічний університет

Анотація

В статті розглядається віртуальна реальність як комп'ютерна технологія і її використання в інженерії та виробничому процесі.

Ключові слова: віртуальна реальність, 3Д моделювання, методи візуалізації, *процес створення, моделювання.*

Abstract

The article considers the virtual reality as a computer technology and its usage in engineering and manufacturing process.

Keywords: virtual reality, 3D modelling, visualization techniques, design process, simulation.

Virtual reality (VR) typically refers to computer technologies that use software to generate the realistic images, sounds and other sensations that replicate a real environment (or create an imaginary setting), and simulate a user's physical presence in this environment. VR has been defined as "...a realistic and immersive simulation of a three-dimensional environment, created using interactive software and hardware, and experienced or controlled by movement of the body or as an " immersive, interactive experience generated by a computer".[1,13] A person using virtual reality equipment is typically able to "look around" the artificial world, move about in it and interact with features or items that are depicted on a screen or in goggles. Most 2016-era virtual realities are displayed either on a computer monitor, a projector screen, or with a virtual reality headset (also called head-mounted display or HMD). HMDs typically take the form of head-mounted goggles with a screen in front of the eyes. Programs may include audio and sounds through speakers or headphones.[2]

The first references to the concept of virtual reality came from science fiction. Stanley G. Weinbaum's 1935 short story "Pygmalion's Spectacles" describes a goggle-based virtual reality system with holographic recording of fictional experiences, including smell and touch. Morton Heilig wrote in the 1950s of an "Experience Theatre" that could encompass all the senses in an effective manner, thus drawing the viewer into the onscreen activity. He built a prototype of his vision dubbed the Sensorama in 1962, along with five short films to be displayed in it while engaging multiple senses (sight, sound, smell, and touch). In 1968, Ivan Sutherland, with the help of his student Bob Sproull, created what is widely considered to be the first virtual reality and augmented reality (AR) head-mounted display (HMD) system. It was primitive both in terms of user interface and realism, and the HMD to be worn by the user was so heavy that it had to be suspended from the ceiling. The graphics comprising the virtual environment were simple wire-frame model rooms. The formidable appearance of the device inspired its name, The Sword of Damocles.[2]

The primary use of VR in a therapeutic role is its application to various forms of exposure therapy, including phobia treatments. Furthermore, the use of VR as a distraction during medical procedures has been studied as well, mostly in children. The reasoning behind this is inspired by the gate control theory of pain.

Certain companies are using VR to target the fitness industry by using gamification concepts from video games to distract from the tedium of exercise. Virtual reality is used as a training aid in many sports such as golf, athletics, skiing, cycling etc. It is used as an aid to measuring athletic performance as well as analysing technique and is designed to help with both of these. It also used in clothing/equipment design and as part of the drive to improve the audience's experience.

Virtual reality engineering includes the use of 3D modelling tools and visualisation techniques as part of the design process. This technology enables engineers to view their project in 3D and gain a greater understanding of how it works. Plus they can spot any flaws or potential risks before implementation.

This also allows the design team to observe their project within a safe environment and make changes as and where necessary. This saves both time and money.

What is important is the ability of virtual reality to depict fine grained details of an engineering product to maintain the illusion. This means high end graphics, video with a fast refresh rate and realistic sound and movement.

In some cases, virtual reality can be used from the start of the design lifecycle, e.g. the initial concept through to the build and implementation stages. This is reviewed at stages to check for faults, structural weaknesses and other design issues.[3]

Car manufacturers use virtual reality for prototyping purposes during the design process. This enables them to produce several versions which are then tested and changed as per the results. This removes the need to build a physical prototype and speeds up the development stage. The result is a cost effective streamlined process.[3]

VR is also used in flight simulation for the Air Force where people are trained to be pilots. The simulator would sit on top of a hydraulic lift system that reacts to the user inputs and events. When the pilot steer the aircraft, the module would turn and tilt accordingly to provide haptic feedback. The flight simulator can range from a fully enclosed module to a series of computer monitors providing the pilot's point of view. The most important reasons on using simulators over learning with a real aircraft are the reduction of transference time between land training and real flight, the safety, economy and absence of pollution.[2]

СПИСОК ВИКОРИСТАНОЇ ЛІТЕРАТУРИ

1.   The VR Book: Human-Centered Design for Virtual Reality / Jason Jerald // Morgan & Claypool, 2015. – 523 p.
2.   Virtual Reality [Електронний ресурс] - Режим доступу: https://en.wikipedia.org/wiki/Virtual_reality
3.   Applications Of Virtual Reality [Електронний ресурс] - Режим доступу: https://www.vrs.org.uk/virtual-reality-applications/

Арсенюк Дмитро Володимирович – *студент групи УБ-15(б) факультету Менеджменту та Інформаційної Безпеки Вінницького національного технічного університету, м. Вінниця, e-mail: dima23790@gmail.com*
Науковий керівник: Рудницька Тетяна Григорівна - *викладач кафедри іноземних мов, email: runina5@mail.ru*

Arseniuk Dmytro Volodymyrovych – *student of Management and Information Security Faculty of Vinnytsia National Technical University, e-mail: dima23790@gmail.com*
The scientific supervisor: Rudnytska Tetiana Hryhorivna - *a teacher of Foreign Languages Department, email: runina5@mail.ru*