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Research on VR Applications Based on Computer Technology

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Abstract. With the continuous progress of the era of science and technology and the increasing abundance of technology products, the influence of VR technology has attracted increasing attention, and people are constantly exploring the uses and possibilities of VR. The evolution history of virtual reality technology can be divided into four stages, and the simulation of sound shape dynamics is the first stage containing the idea of virtual reality. Virtual reality germination is the second stage. The emergence of virtual reality concept and theory is the third stage. The further improvement and application of virtual reality theory is the fourth stage. This paper uses the role of computer technology in VR, and discusses the application of computer in VR and the work that VR can be realized or carried out, such as VR games or use Virtual reality in medical health,even in comprehensive application in urban governance.As well as the current development problems and the prospects for the future.Like Technical restrictions, high hardware costs and Virtual reality content is relatively less represented in various fields.

Keywords: Computer Technology; Virtual Reality; Enjoyable.

1. Introduction

VR is a computer simulation system that can create and experience virtual worlds, using computer-generated simulation environments to immerse users in them. It was first introduced into the aviation industry in the 1960s. In the following decades, with the continuous progress of the technological era and the increasing richness of technological products, the impact of VR technology has received more and more attention, and people are constantly exploring the uses and possibilities of VR. The evolution history of virtual reality technology can be divided into four stages, and the simulation of sound shape dynamics is the first stage that includes the idea of virtual reality. The emergence of virtual reality is the second stage. The emergence of the concept and theory of virtual reality is the third stage. The further improvement and application of virtual reality theory is the fourth stage. This article utilizes the role of computer technology in VR, discusses the application of computers in VR, the work that VR can achieve or carry out, as well as the current development problems and future prospects of applications. It has been increasingly widely applied in fields such as education, healthcare, and entertainment.

2. The Application of Computer Technology in VR

The computer technology which is use in the VR are “image enhancement”,“image recognition”,“image compression”.In the digital age, the interactive function display design using computer technology has a positive role and significant influence in VR [1].

2.1. Image Processing Technology

Image processing technology plays a vital role in virtual reality. The design process in traditional computer graphics is based on a "waterfall" model, in which specifications are converted into designs, and designs are converted into implementations. At each step, the overall consideration is to meet the specification. The overall process of VR design based on these considerations is one of multiple levels of iterative process, in contrast to the more common but linear "waterfall" design process. To increase the chances of success, the design process should be highly flexible and responsive to major redesigns identified during implementation. In order to identify the required redesign at the appropriate stage of the design and development process, performance analysis, testing, and user testing should be an

integral part of this process [2]. First, the image processing technology can be used to improve the image quality in virtual reality, and to enhance the image clarity, contrast, and color saturation. For example, by using algorithms to suppress image noise, blur, and distortion, images can be made more realistic in virtual reality. Secondly, the image processing technology can realize the real-time processing and rendering of the images, making the virtual reality scene more smooth and realistic. For example, using image compression and uncompression algorithms can realize image transmission and display with high frame rate and low latency, improving the user's perception of virtual reality experience..Image enhancement is a part of Image processing technology,it is a processing technique designed to improve the quality and visual effect of images.The main purposes of the image enhancement include is Improve the image quality. By modifying the reduced quality of the image, the image becomes clear or emphasizes certain features of interest. Enrich the image information. Enhance the useful information in the image, suppress the features of no interest, and expand the difference between the different object features in the image. Improve the readability of the images. The model processing method is based on the characteristics of the human eye to identify and understand the image content.

2.2. Data Storage

The key technologies and applications of data storage in VR mainly include: data compression technology: In order to reduce the storage space and improve the transmission speed, virtual reality data needs to compress. Commonly used data compression techniques include JPEG, PNG, MP3, etc.Distributed storage technology: In virtual reality and augmented reality applications, data can be stored on different devices and networks. Therefore, it is necessary to use distributed storage technology to achieve high availability, high performance and scalability of data. Data security technology: In virtual reality and augmented reality applications, the security of user data is critical. Therefore, it is necessary to adopt data security technologies such as encryption, authentication and authorization. To protect the security of the user's data.Storage of the data needs to be statistically classified in the database.Database management system: Virtual reality and augmented reality applications need to store large amounts of data, such as user information, game data, etc. Therefore, the Database Management System (DBS) is required to store, manage, and query this data.

3. Application of VR in Different Fields

3.1. VR Technology in Architecture

The use of VR technology in the architecture, such as architectural design, building safety education, design and construction simulation exercise, enhance the visibility of design and construction. First is architectural design. VR architectural design allows architects to use hardware devices and software platforms of virtual reality technology to immerse themselves in real-time and experience the functional space of virtual scenes for architectural creation and design. Through VR simulation of virtual reality environments, architects can analyze the basic elements of architectural design, such as the experience base and environment, indoor and outdoor spaces, light and shadow relationships, sense of scale, building materials and colors, and make modifications and improvements to the plan during the experience process. This technology greatly compensates for the missing steps in the traditional creative process of experiencing architectural space, assists architects in scrutinizing plans in VR virtual reality space, and promotes scientific decision-making and optimal evaluation of plans. Second is building safety education. China Construction Fifth Engineering Co., Ltd. has established a virtual reality (VR) safety education experience hall in its construction projects, allowing workers to experience construction site safety incidents and rescue such as falling from heights, object strikes, and fire rescue on VR equipment, improve safety awareness, and ensure the smooth progress of the project. Third is design and construction simulation exercise.VR can enhance the display effect of design results in building and interior design, and can also conduct construction simulation exercises in an immersive manner, helping construction parties understand the construction process. In

construction, VR is mainly used to strengthen project management, design, workflow sorting, and customer interaction. VR enables users to immerse themselves in the construction process, clearly and clearly view every component of the engineering structure, and comprehensively grasp the construction process's craftsmanship, which helps to achieve the transition between virtual and reality.Last is Enhance the visibility of design and construction.VR can enhance the display effect of architectural and interior design results in terms of visibility in architectural design. Interior designers can use VR to complete immersive home decoration designs, and with the support of VR design software, architects are expected to achieve VR architectural design in the near future.

3.2. VR Technology in Medical

Virtual reality technology has many practical applications in the medical field. The widely used virtual systems currently include: surgical virtual surgery simulation training, virtual internal medicine diagnosis, Chinese massage, exercise therapy and rehabilitation, digital hospital medical simulation and teaching, etc. Virtual reality technology can provide personalized medical diagnosis and treatment, accurately predicting the different reactions of the human body to different treatment plans. In contrast to traditional subjective judgments, performing various diagnostic and therapeutic experiments on virtual humans are impossible.Scientific analysis and judgment can be conducted according to the obtained treatment data and human response, so as to develop a more reasonable, more realistic and more feasible diagnosis and treatment plan.The virtual surgical simulation system can create a virtual surgical environment according to various medical image information and data, and establish a 3D model in the virtual environment to design the incision position and Angle, preview the operation process, and can predict the possible problems during the operation in advance and take remedial measures, so as to improve the success rate of the operation.With this virtual system, doctors can choose the surgical plan and methods more reasonably, reduce all kinds of injuries and injuries caused by the operation, improve the accuracy of accurate judgment of the location of the lesions, and have a good auxiliary judgment effect for all kinds of complex medical and surgical operations.Virtual reality surgical simulation can be defined as the use of computer-based mathematical models to generate surgical relevant environments, and humans can interact with mathematical models by using physical representations of surgical instruments [3]. The investment in expensive experimental subjects and equipment is a huge burden for medical research institutions. The establishment and application of virtual surgical systems can greatly reduce the economic burden on medical research institutions, and also effectively shorten the surgical training time for researchers. The virtual surgery training system can provide an immersive virtual environment, and its realistic restoration effect can make the training process consistent with real operations, allowing researchers to obtain a realistic experience of actual operations. In addition, the virtual reality system in medical university teaching activities is not limited by specimens, venues, time, etc., allowing teaching activities to be carried out anytime and anywhere according to needs, while reducing investment in teaching costs and achieving good teaching results. At present, some virtual reality systems developed specifically for medical training, practice, and research have a very high degree of simulation, and their advantages and effects are incomparable to traditional teaching activities.Many studies and clinical trials have used VR as a simulation, interactive, and distraction tool for people with mental disorders such as posttraumatic stress disorder, anxiety, phobia, specific phobias, schizophrenia, autism, dementia, and severe stress.The virtual reality environment demonstrates the possibility of modifying anxiety, depression, cognitive and social functioning through an interactive virtual environment, and presenting cognitive-behavioral approaches by effective exposure to anxiety, depression, cognitive and social functioning [4].

3.3. VR Technology in Educational

Virtual reality can provide an exciting and engaging way of learning and teaching., But there are still challenges need to overcome problems to make the school feasible [5]. Research has shown that (AR) and virtual reality (VR) have strong potential in helping students improve their skills and knowledge [6]. Virtual reality technology has been widely applied in education, which can change the traditional

teaching mode, enable students to learn, better understand and master knowledge, and improve learning efficiency. Research has found that using VR can effectively improve students' learning experience in specific teaching environments. This effect largely depends on the match between the textbook and virtual reality technology [7]. However, introducing VR as an educational tool into the classroom is based on a balance between its benefits and obstacles. When using virtual reality in real classrooms, one should be more cautious [8]. Firstly, virtual reality can use virtual classrooms to simulate real classrooms, allowing students to learn in a virtual reality environment, making the learning process more interesting and relaxed. Secondly, virtual reality can simulate real laboratories through virtual laboratories, providing students with a more intuitive scientific experimental experience and helping them better understand and master experimental principles. In addition, VR technology can be used to simulate complex scenes, allowing students to experience and practice in VR environments, thereby better understanding and mastering knowledge. In addition, VR technology can also be used to simulate real-time environments, allowing students to experience and practice in real-time in different worlds, rather than in real environments, in order to save time and money, and be safer. The development of education services based on virtual R is expected to form a technological foundation for interactive learning experiences, playing an important role in the knowledge economy and global information society [9].

3.4. VR + Smart City

VR + smart city, explore the integrated application of virtual reality in urban governance, and form urban visual management solutions. Promote life assistant applications based on user geographic location service (LBS) and high-precision visual positioning service (VPS). Improve the capability of operation and service of digital space, explore the three-dimensional commercial construction mode of indoor and outdoor real scenes, and create efficient and convenient, personalized intelligent life information services integrating virtual and real for transportation, catering and shopping, entertainment and leisure scenes. Point-volume real-time cloud rendering is based on cloud computing + low-latency transmission, realizing the convenient use of large cloud software and 3D applications for various light terminals. The application of this technology helps virtual reality in the interactive level, and users have a better experience. It effectively expands the application scenario of virtual reality, and solves the problem of insufficient performance of some users' equipment. It realizes an efficient, convenient and low-cost operation mode.

4. Discussion

With virtual reality (VR) technology constantly evolving, Once thought that the industry would quickly rise up and change the way we live. However, in recent years, the VR industry seems to have entered a phased bottleneck period and faces many challenges.

The first is the reasons for the bottlenecks in the VR industry, such as the technical limitations. Although VR technology has made significant progress in vision and hearing, there are still needs to be breakthroughs in touch and smell. This makes the VR experience still seem unreal in some ways, affecting user immersion. And the costly of the hardware. High-quality VR equipment is expensive, making it difficult for ordinary consumers to afford it. In addition, the low popularity of VR equipment also limits the expansion of the VR market. And a lack of content. At present, VR content is relatively scarce, and the quality is uneven. The lack of high-quality content leads to the lack of user stickiness, which further restricts the development of VR industry. Finally, the market awareness is low. Despite the attention of VR technology in the industry, the awareness of VR among ordinary consumers is still low. This leads to insufficient market demand and it difficult for companies to make profits. Strategies to deal with the bottlenecks.

The first is technological innovation. Enterprises and research institutions should increase the research and development of VR technology, break through the technological limitations, and improve the user experience. For example, developing more realistic tactile feedback technologies,

reducing delays, and so on. The second is to reduce costs. Reduce hardware costs through technological innovation and scale effects, so that more consumers can afford VR devices. In addition, it can be integrated with existing devices such as mobile phones and computers to lower the purchase threshold for users. A related concern is that most VR toolkits do not offer higher-level interactions [10]. The third is content creation. Content creators are encouraged to create quality content for VR platforms and enrich VR application scenarios. At the same time, establish a content review mechanism to ensure the quality of the content. The fourth is marketing. Strengthen the publicity of VR technology and improve the market awareness. By holding experience activities and cooperative promotion, more consumers can understand and experience VR technology. Future development trend. I think the VR of the future can cross over. With the continuous development of 5G, AI and other technologies, VR is expected to achieve cross-border integration with these technologies and expand its application scenarios. For example, combining 5G high-speed transmission technology to realize VR experience with low latency and high picture quality; using AI technology to improve intelligent recommendation and personalized customization of VR content. It can even expand its industry applications. In addition to games and entertainment, VR technology in education, healthcare, real estate and other industries will gradually expand. For example, remote surgery training through VR technology, virtual house visits, etc. Innovation is be possible in the social space. VR technology brings entirely new possibilities to the social space. In the future, VR-based social platforms are expected to become the mainstream, allowing users to achieve a more real interactive experience in the virtual world.

5. Conclusion

This paper explores the application of VR in medicine, architecture, education, such as VR can effectively show ideas in virtual reality, design buildings in architecture, and better show some practical cases in the field of education, and the help and function of computer technology for VR technology. For example, image processing technology can help VR to analyze and process images, and 3d model can help VR modeling. Overtime, the times have progressed. The future of virtual reality is full of challenges, and should explore more possibilities. For example, the combination of artificial intelligence and virtual reality technology gives artificial intelligence as a virtual carrier. Or implement large games such as virtual Earth, where players can explore more lives. It may face more challenges, more difficulties, but as long as more possibilities are explored, the future of virtual reality will be full of possibilities.

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