Application of virtual reality technology in intelligent cold chain logistics system

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Abstract. The origin of virtual reality technology can be traced back to the 1950s decades ago. In recent years, with the rapid improvement of computer graphics processing, computing ability and other technologies, virtual reality technology and equipment began to mature. Starting from the application and development of virtual reality technology in various fields, this paper analyzes the basic application process of virtual reality technology, and describes the value and content of its application in the intelligent system of cold chain logistics.

1. Application and development of virtual reality technology

Since 2015, the number of enterprises participating in the virtual reality field has increased significantly. The research and application fields have gradually developed from the military, science and technology, medical and other technical research fields to the production, entertainment, education and other life application fields, showing a good application prospect, and the virtual reality industry is developing rapidly in China. With the promotion of capital, more and more enterprises will set foot in the field of virtual reality. With the upgrading of technology, the popularization of mobile intelligent devices and the further development of mobile Internet, mobile virtual reality technology will gradually mature, and the hardware production will gradually realize industrialization and scale.

First, the key indicators of virtual reality hardware technology include square meter refresh rate, resolution, delay, computing and rendering capabilities. At present, the domestic leading manufacturers have reached the standard in the four indicators, and the virtual reality technology is gradually mature. At the same time, other technologies such as attitude correction, reset, accuracy, delay, voice interaction, gesture recognition and other aspects of the input device continue to improve. Transmission equipment is gradually speeding up and wireless; product volume, land occupation and modular design make it more convenient to move and install and debug; the product endurance and battery storage capacity are also gradually improved; the development of supporting systems and middleware is becoming more and more perfect.

Second, with the improvement of hardware products, the compatibility of software system and hardware has also made rapid development. At present, windows and Android systems have been able to better support most virtual reality software and hardware products, and can provide better experience.
and application. Virtual reality system and application will step to a new level. Virtual reality system is becoming more and more mature, there will be more suitable virtual reality equipment and system, system compatibility will be greatly improved.

Third, the quantity and quality of virtual reality content are constantly improving. Currently, the company will be able to produce a large amount of virtual content based on the popularity rate of virtual reality devices. The content sharing and distribution of virtual reality resources will provide content support for project application.

Fourth, domestic virtual reality technology and equipment research and development closely follow the international technical level, which can provide better products, solutions and localization services for project construction.

With the Internet as the core, a new round of technological and industrial revolution is ready to start, and new technologies such as virtual reality are changing with each passing day. The combination of virtual and physical will bring revolutionary changes to people's production and lifestyle, and will certainly provide strong support for the development of virtual reality technology and the construction of VR center. The development of virtual reality industry promotes the maturity of related technologies and promotes the development of VR+education, VR+commerce, VR+military and other applications.

2. The technology realization process of VR application
VR technology application follows the following five basic steps, combined with high-end dynamic capture equipment, 3D stereo display technology, 3D printing technology, vr virtual technology, complete the construction of virtual world system.

2.1 System requirements analysis. Virtual reality technology is used in the interactive system which highly integrates virtual simulation technology and graphics processing technology. It presents, restores and constructs scenes that are difficult to realize and copy in the real world through virtual space. By participating in the activities in the virtual world, the Experiencers can get the sensory experience of the real world. The presentation effect of virtual world is based on the requirement analysis at the beginning of system design, and the real requirements are superimposed into the construction of virtual scene to reproduce the real scene as much as possible.

2.2 The system style is determined. The virtual world style affects the user's perception, reflection and interaction of the real world, and determines and refers to the real scene, and selects the appropriate project interface style according to the characteristics of the project. [1]

![Typical interface style of virtual reality system.](image)
For example, modern industrial style is also known as "loft style". Metal is one of the indispensable elements. The layout of the elements is solid, the edge is thick, and the sense of metal is strong. The overall effect is personalized and avant-garde. The style of science and technology makes people feel that it is the future and high-tech product. The elements are light, bright and transparent, and are mainly composed of particles and light (lines) Pure dark background; flat style design is gradually applied in many fields such as web page, VI and UI design. It is simple and atmospheric, clean and comfortable, logical and not easy to produce visual fatigue, so it is more and more popular; the theme style is more diversified, which is based on the characteristics of each project to design elements, rich colors, and will be more modern.

2.3 Project model creation. Virtual world scene creation requires the use of computer technology to enable users to experience three-dimensional experience when observing the virtual scene in all perspectives and Directions [2]. In order to provide users with the best sense of real experience, environment modeling and object modeling need to strictly calculate the proportion to fully simulate a virtual environment that is completely consistent with the real environment. On the premise of ensuring that it is close to the reality, the number of model patches should be optimized as much as possible to speed up the real-time calculation and improve the efficiency of the model and the whole scene rendering.

2.4 System construction. Through the VR construction engine, through the creation of a good model to build a complete virtual three-dimensional space, complete the virtual world environment layout, including environmental scene construction, camera angle, light source selection, model surface texture and texture design, etc. [3]. Thus, the virtual world construction similar to the real environment is completed, and users can enter the scene and roam through the special VR equipment.

2.5 Interactive design. In the constructed virtual environment, real-time interaction between various interactive devices and objects in the virtual environment is carried out, and all kinds of human-computer interface interaction are carried out. The experience is the same as the real experiment, such as roaming, collision detection, product selection, artificial intelligence experience, etc., which can save the cost of building the real scene, and ensure personal safety for the dangerous environment and site It is called twice the result with half the effort.

3. Application of virtual reality technology in intelligent cold chain logistics system
In order to ensure the quality of fruits and vegetables, aquatic products, medicine, dairy products and other goods and reduce the loss in the circulation process, all links from production to sales are under the specified temperature control. The low-temperature logistics process based on refrigeration technology and by means of refrigeration technology is called cold chain logistics. Cold chain logistics always runs through the supply chain from raw material suppliers to end consumers. The whole process of temperature control ensures the quality of goods, and the cold chain goods are transferred step by step through the links of purchase, transportation and distribution.[4]

The construction of virtual simulation system of cold chain logistics intelligent system breaks the limitation of time and space, solves the problem of displaying contents and links that cannot be presented due to product and condition constraints, and can give full play to the advantages of virtual projects.

First, the cold chain logistics needs special devices, and the whole process has the characteristics of wide range of knowledge, strong cross, many influencing factors, large uncertainty and complex space-time scale, which determines that the cold chain logistics is difficult to operate in reality. The emergence of wireless technology, large storage capacity server and virtual reality (VR) equipment effectively enriches the virtual simulation means of cold chain logistics, and can effectively carry out the realization of virtual reality of cold chain logistics process, facilities and equipment.

Second, the complex process work of transportation organization and freight business agent involved in logistics business operation and management, as well as the precise experiments of cargo monitoring and analysis, temperature control and freight time allocation involved in the work of refrigerated and
frozen transportation scheduling and distribution of refrigerated and frozen goods can be clearly
demonstrated through virtual reality technology, so as to build an intelligent environment for virtual
cold chain logistics, It can not only avoid possible risks, but also expand the depth and breadth of
intelligent content. Through human-computer interaction, it can guide the experiencer to deeply
understand the complex environmental system, deepen the understanding of the abstract theoretical
system, and enhance the quality and ability of flexible use of theoretical knowledge, so as to reflect the
experiential and practical. [5]

Third, the virtual simulation technology is used to assist the intelligent logistics experiment data test.
In the intelligent research of cold chain logistics process, it is difficult to build experimental environment,
which is time-consuming, laborious and high consumption. Virtual reality technology can effectively
solve these problems. Virtual reality and scenario simulation environment construction can record the
adjustment process and state changes, and dynamic record of experimental data, which can simulate the
operation environment of cold chain logistics equipment such as cold storage, controlled atmosphere
warehouse, refrigerated vehicle, etc, The application of technical equipment in cold chain logistics
environment provides a full simulation experimental environment.

4. Conclusion
Virtual simulation technology helps the development of various industries and the presentation of
technical achievements. The virtual simulation of cold chain logistics can promote the combination of
virtual reality technology and cold chain logistics, and realize the application of virtual reality
technology in the intelligent system of cold chain logistics. First of all, we should analyze the
construction demand of cold chain logistics, which is a complex supply chain chain, including freezing
processing, freezing storage, freezing transportation and freezing sales. Cold chain logistics is a special
logistics form with a very high proportion of logistics cost. In this process, we need to pay attention to
the transportation process, time control, transportation type and other factors, and build the model and
scene of each link according to the demand. Using virtual roaming, we can show all aspects of cold
chain logistics supply chain more intuitively, so that users can completely immerse themselves in the
virtual world, experience the experience of immersive experience, so as to have a deeper understanding
of cold chain logistics. The intelligent virtual simulation platform of cold chain logistics will expand the
promotion and influence of cold chain logistics related technologies, promote the transformation and
application of research results to the market, and improve economic benefits.

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