Advertising Design based on Virtual Reality Technology

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Abstract: - With the rapid development of computer simulation, amorphous display science and technology is not limited to cutting-edge research in the laboratory, but has penetrated all walks of life, bringing earth-shaking changes to people's daily life. In the field of advertising design, virtual reality technology provides a brand-new platform, which makes advertising design no longer just a continuation of graphic design or traditional video production, but an innovative way closely combined with user experience. By highly simulating the environment and situation of the real world, virtual reality advertising can create unprecedented visual effects and emotional experiences, thus greatly enhancing the brand's appeal and memory. This unique media form has undoubtedly had a far-reaching impact on the advertising market, which not only changed the consumption habits of consumers but also reshaped the communication relationship between advertisers and audiences. The purpose of this dissertation is to deeply analyze the development of web-based fantasy world technology and its far-reaching influence on advertising communication, and at the same time explore how to adapt to the new challenges and opportunities brought by virtual reality technology with innovative design ideas and methods. In this era of accelerating digitalization, we need to rethink the essence of advertising and the way of communication, to make better use of the potential of this emerging technology, promote the development of the advertising industry, and achieve more accurate and efficient communication goals. Through this paper's discussion, I hope to provide a new perspective for professionals engaged in the advertising industry to gain insight into market trends and find solutions for them to adapt to this emerging communication mode in future advertising design.

Key-Words: - Virtual reality, Advertising design, Dissemination, App, Application, Media.

1 Introduction

With the rapid development of IT, technology is progressively permeating all aspects of people's social lives, and virtual reality technology is gradually developed from 3D movies. At present, this technology has been widely used in many industries such as medical care, entertainment, advertising, real estate, archaeology, and so on, guiding the technology from niche applications to mainstream development trends. In the advertising industry under the background of the market economy [1], the innovative development of virtual reality technology has attracted extensive research attention of advertising practitioners. Virtual reality technology can realize the full interaction between people and computer technology, including computer animation, vision, artificial skills, recognition mode, automatic control, sensing technology, etc., and can bring interactive, immersive, and virtual three-dimensional environment experience to users. And the interactive operation between virtual reality technology equipment, such as stereoscopic display system, tracking and positioning equipment, three-dimensional mouse, feedback data gloves, etc., so as to use VR, holography, and other information technologies to truly build a virtual model research. Therefore, in this article, virtual reality is introduced to advertising design and proposes to build a VR-PDES (Virtual Reality-Product Data Management Evolution System) advertising design system, which can bring immersive advertising effects to users, [2].

2 Overview of Virtual Reality Technology

To understand what advertising design based on VR technology is, you must first understand VR technology itself, VR technology, or virtual reality technology, is a technology that allows you to create and experience the virtual world of the world, a computer simulation system that can create and experience a virtual world. The principle is to use computers to generate a simulated environment in

which the user is immersed in a systematic simulation of a multi-source information-fused, interactive three-dimensional dynamic view and entity behavior.

Virtualization technology (VR) can use electronic technology and computer technology to bring people a realistic three-dimensional effect of audio-visual, tactile, and visual senses. By designing special interactive devices, such as special helmets, hats, environmental sensors, and gloves, users can effectively participate in the creation of the virtual world based on their own feelings and use human natural skills, and can also let users be in the virtual simulation environment to create real and convenient human-computer interaction. The VR-PDES system designed in this study can realize different perceptions of objective things in a differentiated environment. What is the final effect of advertising design? By designing the VR-PDES system to use virtual reality technology, the information database under a virtual reality environment is established, so as to meet the data information needs of the traditional advertising design systems.

From the concept can be seen that it has a sense of immersion, interactivity, and multi-sensory characteristics, immersion is to make the user as if in a real environment, the user himself is a member of the environment, to be able to use the first point of view to observe the various details around. Interactivity, on the other hand, refers to the fact that when the user is immersed in the environment created by VR, the visual and auditory experience in the VR scene will be a real experience for the user, who can independently select the content they want to watch in the VR scene and interact with it to get very natural feedback. Multi-perception is that VR technology in addition to the visual experience, and auditory experience, but also more tactile perception, motion perception, etc., the ideal VR experience should have all the perceptual functions that people have.

Virtual reality has changed the traditional means of advertising communication, making people change from passive acceptance of advertisements to active appreciation of advertisements. Immersive Company of the United States has launched the world's first virtual reality advertising publishing platform, where advertisers can publish advertisements and track and count the data of advertising effects. After a period of data analysis, it can be seen that the effect of advertising on virtual reality platforms is better than that on mobile phones or PC, [3].

In the statistics of 2016, the click-through rate of virtual reality advertisements reached more than 30%, while that of mobile phones was 1%, and that of PCs was only 0.4%. The advertising conversion rate of network virtual reality is 5.3%, while the advertising conversion rate of mobile virtual reality is only 0.05%. Moreover, statistics show that 80.6% of users will finish watching the advertisements of virtual reality. The high conversion rate of virtual reality advertising has brought a new revolution in advertising production and communication, which is different from traditional advertising and mainly focuses on copywriting and graphic design. Virtual reality advertising mainly shows creativity and marketing. Through video animation and virtual reality technology, it gives people a very interesting advertising experience. Moreover, the spread of virtual reality technology advertisements is also growing at a high speed. Virtual technology is constantly updated and improved, including pre-production and post-tracking of advertisements. In the current virtual reality technology, we can only track whether the user clicks on the advertisement or leaves the application. In the future, it may be possible to track and record whether the user turns his head [4], closes his eyes, speaks, and leaves when playing the advertisement. This kind of virtual reality technology, which can be recorded through the intelligent identification system in such detail, can greatly improve the authenticity and accuracy of the analysis data of advertising delivery effect and can analyze the advertising delivery effect more effectively for advertisers, and change the advertising delivery strategy at any time according to the recorded data.

Virtual reality is strongly welcomed in advertising and brand marketing, not only because of its novel experience form but also because of its unique and unrepeatable characteristics. Compared with traditional outdoor print advertisements and video advertisements on TV networks, the interactivity and immersion of users generated by virtual reality technology can attract the full attention of the audience in a short time. When customers and consumers wear special virtual reality equipment, people will be attracted by extremely real virtual reality images, and the all-around experience brought by virtual reality technology will more easily resonate with emotions and bodies, while traditional advertising has no such advantages. Some research data show that people's memory of virtual reality experience stays for a long time, and the memory is also deeply preserved. With the diversification of brand marketing methods,

virtual reality technology can be applied to more industry fields through various forms, [5].

3 Design of Virtual Advertising VR-PDES System

3.1 System Structure

This virtual advertising VR-PDES system (Figure 1, Appendix) mainly includes three functional modules: human-computer interaction virtual interface, advertising photograph information getting the module, and advertising virtual expansion module. In Figure 1 (Appendix), the advertisement image information is extracted through the plane advertisement interface information acquisition module, and successfully transferred the information to the virtual upgrade module through the module. After the plane virtual enhancement module successfully receives the information of photograph elements, Images can be used in virtual technologies based on visual features, this provides a good human-computer interaction virtual advertising interface that provides a good visual experience for the user, [6].

3.2 Function Realization

3.2.1 Advertising Interface Information Collection Module

In designing the system for optimizing graphical advertisement images, the module used to collect information from the advertisement interface mainly consists of an image sensor, a serial UART, an FPGA controller, and an SDRAM memory. Figure 2 (Appendix) shows the architectural design scheme of the entire module, where the FPGA controller component is the most important hardware component, [7]. The sensor used in this module is OV760, and the acquired image signals can be translated in real-time, and the metadata of the image is stored in the sdram memory according to the final translation result, that is to say, it completes the acquisition, and storage of image data in this module.

3.2.2 Design of Virtual Enhancement Module for Display Interface

The virtual enhancement schematic of the display interface is shown in Figure 3 (Appendix). The image element information extracted by the advertising interface information acquisition module is transferred to the display interface virtual enhancement module, and when the SDRAM

memory is full of valid pixels, the successful migration of memory Double Data Rate (DDR) can be accomplished within the image acquisition storage area. When it is necessary to obtain the image element data of a frame or a larger storage area, the image visual effect can be enhanced with the help of the visual optimization and enhancement algorithm of the print image element of the print virtual enhancement module to obtain the virtual interactive experience, and the final data of the image can be deposited inside the DDR return image memory first, and then migrated to the First In First Out (FIFO), with the help of The DS90CF383 encoding achieves the successful display of the final standard image elements, and the color of the image elements of the print advertisement is effectively processed to obtain the virtual interaction of human-computer interaction.

3.3 Virtual Interactive Interface Feature Extraction and Classification

When designing virtual interactive representations of advertising interfaces, the method can be used to extract features from printed advertisement images. The first is the horizontal method and the second is the vertical block method, which can extract the image feature entropy values in two directions of the brand logo, and calculate the color and weight characteristics of the entropy advertising image area according to the final image entropy feature differences, thus forming the underlying features of the advertising visual element system. By retrieving the underlying regional features of advertising image elements, we can regard the regional color and entropy features in the previous section as optimized design comprehensive features in the process of classification and retrieval, and we can transform the underlying feature problem in the region into a sparse vector coefficient problem by differential classification, so as to successfully realize the visual classification of plane advertising image elements, [8]. Take this part of the programming code as an example:

```
CREATE TABLE`ecs_ad_position`(
`position_id`tinyint(3)unsigned NOT NULL AUTO_INCREMENT,
`position_name`varchar(60)NOT NULL DEFAULT'',
`ad_width`smallint(5)unsigned NOT NULL DEFAULT '0',
`ad_height`smallint(5)unsigned NOT NULL DEFAULT '0',
`position_desc`varchar(255)NOT NULL DEFAULT'',
`position_style`text NOT NULL,
```

```
PRIMARY KEY(`position_id`)
)
ENGINE=MyISAM    AUTO_INCREMENT=2
DEFAULTCHARSET=utf8;
```

4 Hardware of VR-PDES System

4.1 Virtual Environment Generator
The simulation environment can generate a dynamic dual-view three-dimensional virtual interactive environment by using computer technology. Then the core components in the design process of the system are three-dimensional software and hardware environment, which can receive advertisement page information and form a three-dimensional advertising interface, [9].

(1) The software environment can generate realistic visual system tasks and construct polygon visual effect graphics. We can take the standard layer of the OpenGL project as the main development key point, and successfully develop complex advertising interface scenes through special work software;

(2) The visual reality brought by a VR system in a hardware environment is closely related to two major factors. The time delay of the system and the polygon construction of graphics can reach the delay time within 10ms, thus enhancing the authenticity of the advertising interface. The longer the delay time, the worse the authenticity of users' virtual feelings.

4.2 Input and Output Equipment
In order to make the advertisement design realize the visual, tactile, and auditory differentiation and form the information interaction effect with the virtual interactive interface, it is also necessary to use the display, three-dimensional glasses, etc., which are associated with the user's display, measure the user's line of sight direction, and change with the scene change, and also provide less data obstacle interfaces.

4.3 Data Interface
The data interface is mainly used to effectively connect the virtual environment generating devices, input and output devices, and host terminals, and also includes hardware coordination, such as man-machine interface operation technology and software and hardware debugging, [10].

5 System Software Implementation

5.1 Software Framework
With the increasing nonlinear processing ability of neural networks for large-scale complex systems in recent years, this system design is based on WTK virtual reality development tool software, which can realize differentiated hardware platforms including PC, and provide a C function development database. Figure 4 (Appendix) is the software flow frame diagram of this system design.

The key to the processing of this system software is its ability to collect and manage advertising interface data information, so database design is also crucial. By using AOD database access technology, establish an Access database, and develop programs based on OELOD database technology implemented by Microsoft. Applied in this system, it can achieve convenient application, fast speed, reduce unnecessary overhead memory [11], achieve a small number of layers of front-end data sources, and achieve high-performance lightweight interfaces.

5.2 VR-PDES System Workflow
The workflow of advertising design based on virtual reality technology includes:

(1) Select image feature elements for the advertising design interface, and select virtual reality area feature indicators;

(2) Assign virtual design indicators, including weight parameters related to appearance, layout, motion and dynamics, advertising and roaming, etc;

(3) Display the results of the final virtual reality optimization design. The system design user selects the system aggregation effect and ultimately displays the virtual design of the advertisement;

(4) Accumulate and update the database of advertising virtual display technology, and continuously improve the applying Virtual Reality in Advertising Design by completing the training of database advertising virtual reality samples and learning and summarizing virtual design indicators.

6 System Testing
In order to verify the effectiveness of the proposed advertising design system based on virtual reality technology and the visual optimization virtual interaction formed by users in the application, this experiment was conducted and selected the composition images in the Access database, there are 5000 AD photos. Based on Windows operating system. The experiment is programmed with Matlab2016 simulation platform. A method of

extracting advertising images by using parameter features and entropy (virtual interaction design area for identifying advertising images), record the results of the optimized design, construct the matrix and record the identified areas. The design is then optimized using the texture spectrum method to achieve the virtual effect of advertising interaction, [12].

Effect analysis:
This suggests that the visualization-optimized design approach for planar reclame-elementenbeeld-interactieve virtualization is based on the original highly similar planar reclame-afbeeldingen allowed, as well as the well-interacted ontwerpresultaten virtualization allowed for text, images, and associated diagrams. It confirms that virtual reality technology can be used to optimize visual effects for users in advertising design.

Through the effectiveness verification of virtual reality technology in the advertising design system designed in this project, it was found that the system can achieve different advertising visual effects based on the differentiated visual needs of users. The final results of this advertising design were obtained through the VR-PDES system software, and compared with the actual advertising design results, the application effectiveness of the system was also confirmed. Designing the VR-PDES system software as an intelligent advertising product design method is crucial in creating visual effects for virtual advertising design in the context of rapid technological development in today's era. Therefore, facing the increasingly fierce market competition, it has also gained more and more obvious significance in the development of virtual reality technology for advertising design.

By implementing the optimization idea of the virtual interactive visual advertising design system proposed in this study, it was found that it can effectively enhance the human-machine interaction operation of users in advertising design, resulting in the visual optimization effect of the virtual advertising interface. Moreover, simulation testing has also confirmed the effectiveness of the system's application. It can be found that obtaining a relatively concentrated RGB grayscale value before optimization solves the technical problems of traditional advertising design, such as lack of visual contrast and interactive virtual effects, overall design details are relatively blurry, and poor image edge saliency, in terms of interface feature details. After the optimization of this system design, an interactive virtual advertising visual design system was found to effectively enhance the virtual interactive effect of advertising and improve the overall visual clarity of advertising images.

7 Conclusion

In summary, in the context of the development of modern science and technology, the staff engaged in advertising design and media management should, on the basis of clear requirements of the audience groups for advertisements, reasonably apply the virtual reality technology to optimize the design of advertisements in terms of form and content, to more comprehensively display the characteristics of the product, and to expand the influence of the brand. The development of the information age has brought us a variety of novel technologies, in the understanding how to use them in reality is very important, and VR technology as a popular degree of development technology is still shallow, although it in many aspects has drawbacks, but through the application of the practice of the discovery of the application of exploration, which has a huge potential for development, the application of VR technology to the advertisement, not only to bring more magnificent special effects but also to help the viewer understand more details on the things. The application of VR technology to advertising can not only bring more gorgeous special effects but also help the viewer to understand more details.

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Contribution of Individual Authors to the Creation of a Scientific Article (Ghostwriting Policy)
The authors equally contributed in the present research, at all stages from the formulation of the problem to the final findings and solution.

Conflict of Interest
The authors have no conflicts of interest to declare.
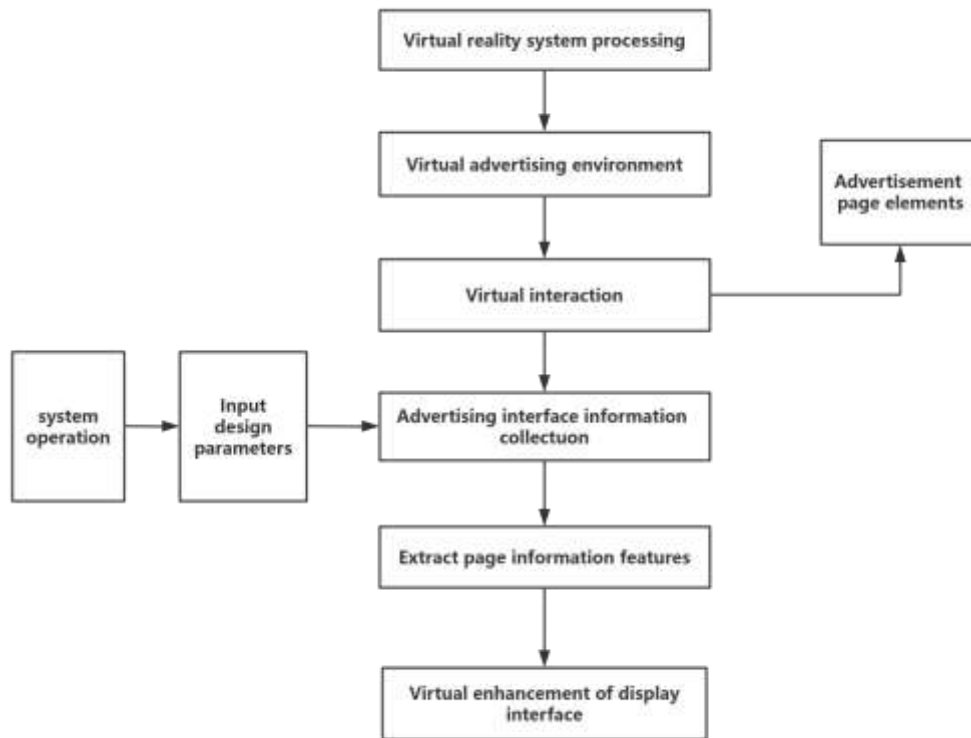
APPENDIX

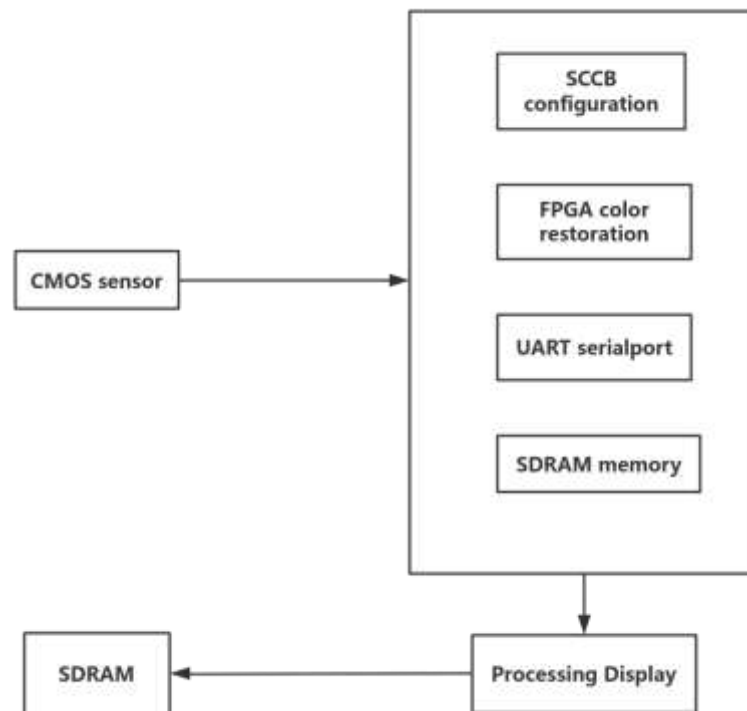Fig. 1: Design Structure of Virtual Advertising VR-PDES System

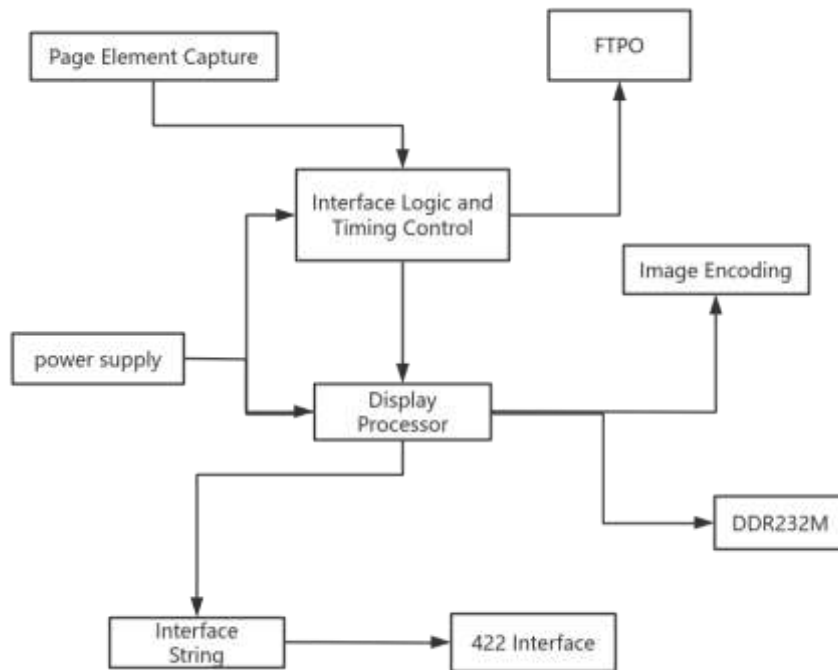Fig. 2: Structural diagram of image acquisition module

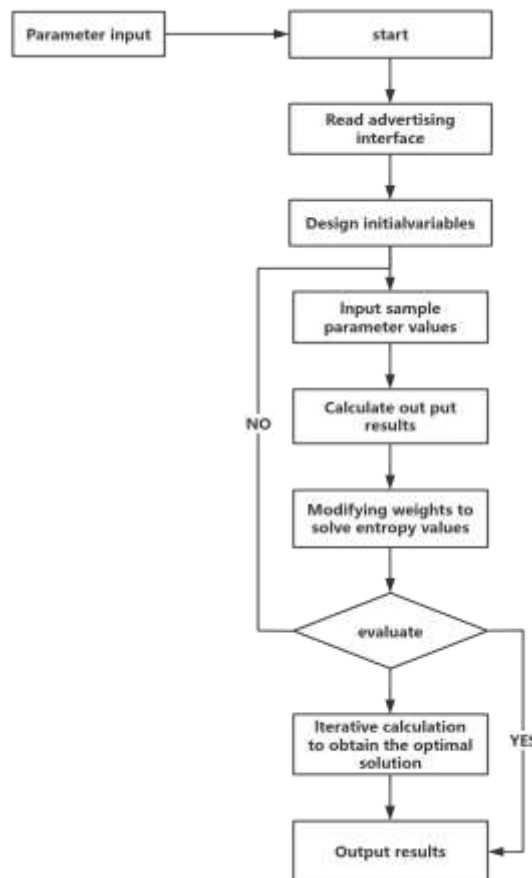Fig. 3: Schematic of virtual enhancement of the display interface

Fig. 4: Software framework of virtual reality advertising design system