

Emotional Interactive Design in VR Animation Creation

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Abstract: As one of the frontier technologies, VR has gradually penetrated into film, drama, game, new media art and many other fields in different forms, like new media, new language and new art. From the perspective of VR animation creation practice, this paper discusses the influence of interactive design in VR space on emotional expression and user emotional experience. The specific issues include the definition of emotional interactive design of VR animation, analysis on VR interactive mode, analysis on the status and problems of VR animation creation, research on emotional expression, emotional interactive design process and methods of VR animation interactive elements.

Introduction

VR animation is a new kind of experiential interactive animation. It applies the real-time rendering technology of the game engine, breaks the spatial boundary between projection screen and screen, and creates an immersive virtual space that greatly enhances the psychological feelings of the audience. Artists attempt to explore the narrative and interactive issues in VR animation creation from various perspectives. In the exploration of VR animation interaction, there have been discussions on the effectiveness of interaction. Because of the different qualities of VR animation experienced by the audience, problems like loneliness, confusion and sand window effect reduce the effect of watching the animation, which is mainly caused by the defects of interactive design and VR hardware technology. Insufficiency of interaction, interactive space, interactive depth makes the sense of participation in story is not strong, and the audience passively follows; Besides, too much interaction can easily distract the attention and lose the main line of the story, which are all defects at the genetic level. Thus, improving the audience's subjective experience and emphasizing the interactive design of emotional experience has become a deeper level of interactive needs and goals in VR animation creation.

Current Situation and Trend of Domestic and Foreign Research

Current Situation of Domestic Research. Domestic academic circles have certain theoretical and practical basis for related research on "emotional interactive design". The existing results include: (1) Emotional design theory: ① Wang Xiuhua and Sun Lei (2006) first pointed out that emotional design is a core content of humanized design. Emotional design takes emotional needs as the starting point, and designs humanized product forms and human-computer interactive mode, which have become the inevitable trend of modern product design. ② Tan Aonan and Li Honghai (2016) proposed three research fields of "modeling and emotion", "function and emotion", and "culture and emotion" on the emotional design of products. ③ Li Jian (2018) connected design elements with a certain emotion of people, and it is called "emotional trigger mechanism" when users reproduce a certain emotion in the situation. (2) Emotional interactive design: ① Ye Dongdong, Li Shiguo (2013) and Zhang Haichao (2016) analyzed the satisfaction of interactive design for users' needs, and discussed their diversified needs in the levels of usability, ease of use and experience in interactive design based on Maslow's hierarchy of needs. ② Li Mengying (2017) studied "humanized" human-computer interaction, and analyzed psychological appeals and emotional

sustenance of users are the keys to emotional design. ③ Luo Lan (2018) analyzed the three levels of emotional design and the link between Maslow's needs and interactive design. (3) VR animation interactive design: ① Qin Jingyan, Fang Wei, and Tao Jin (2007) concluded the features of interactive design in virtual experience and the corresponding interactive design methods of "sensory interaction", "behavioral interaction", and "reflective interaction". ② Domestic VR animation director Mi Li (2016) held that VR interaction is a very natural interaction. To achieve such a perfect interaction, it must be closely connected with the story, plot, scene and props, and meet the audience's physical and psychological needs. ③ Bao Chunxin (2018) pointed out that interactive design is particularly important in VR animation. From the technical level, he proposed the elements of light and shadow design interactive point, sound design interactive point, eye design interaction, as well as interactive node design, VR animation interactive function, etc¹.

Current Situation of Foreign Research. The research on "emotional interaction design" in foreign academic circles has laid a solid foundation for us. (1) Emotional design theory: ① "International Association for Design and Emotion" (1999) was founded at Delft University of Technology in the Netherlands, which marks the beginning of emotional design research. ② Emotional Design by cognitive scientist Donald Arthur Norman (2005) divided emotional design into instinct, behavior and reflection. These three aspects should run through the whole process of design, trigger some behaviors and arouse some emotions of users². ③ Arron Walter (2011) combed Maslow's hierarchy of needs in Emotional Design to form the hierarchy of needs of design, and the emotional design is at the top level of "pleasure"³. (2) VR emotional interactive design: ① Christine Lisetti (2004) invented an intelligent emotional interface for remote family health care, which uses multimodal emotional recognition to identify the emotional state of patients. ② Holger Diener and Karina Oertel (2006) studied the emotional interaction of computer games, and extracted the physiological signal features of different emotions according to different scenes. ③ VR animation director Eugene Chung (2016) stated "although VR is a new technology, I believe that it will still focus on the humanistic spirit, appeal and emotion."

Review on the Current Situation and Trend of Domestic and Foreign Research. In conclusion, emotional interaction reflects a higher level of intelligence in human intelligent thinking and response, and has become an important project of continuous attention in artificial intelligence, human-computer interaction and other fields. Meanwhile, research on emotional design and interactive design related to VR animation has also made some progress. In the process of sorting and analyzing literature, it is found that there are relatively more literature on emotional design, and the research results are relatively mature. However, there are relatively few literature on emotional design from the interactive design, and few research results on emotional interactive design in VR environment. More literature is about the relationship between emotional design and traditional design. In the VR spatial context, we need to find the combination of emotional and interactive design, explore the interactive elements and modes for effective emotional expression in space, enrich and develop the theories of VR animation creation, emotional design and human-computer interaction. From the perspective of creation, we need to find the narrative and interactive combination, and grasp the important feature to "experience story" of VR animation. It is necessary to integrate the emotional interactive design naturally and organically into the narration, form a set of basic interactive paradigm, and provide the basic method guidance for VR animation creation.

Basic Issues of Emotional Interaction Design

¹ Bao Chunxin. Research on Interactive Design of Virtual Reality(VR) Animation[J].Video Engineering, 2018(08).

² Donald Arthur Norman. Emotional Design, why we love or hate everyday things. A member of the Perseus Books Group[M]. Publishing House of Electronics Industry, 2005.

³ Aarron Walter, Designing for Emotion[M].Happy Cog, 2011.

Definition of Emotional Interactive Design for VR Animation. The emotional interactive design in VR animation is based on the theory of "emotional design". In the scope of film and television animation creation, it explores the process of realizing a complete and natural emotional experience through the interaction between human and VR system in the digital space of virtual simulation created by VR.

Analysis on VR interactive Mode. VR interaction belongs to human-computer interaction in VR space. To fully understand the interactive issues in VR space, it needs to conduct multi-angle and multi-dimensional investigation from the perspectives of media environment, semantic domain, cultural features, etc. Besides, it also needs to comprehensively analyze the interactive elements and modes, and then extend to VR animation creation, and discuss the change of creation mode and concept. The research of VR interaction is the expansion and promotion of the original human-computer interactive design⁴.

Analysis on VR Animation Creation. The present VR film and television creation has not reached the goal of "effectively emotional", and the deeper emotional interactive potential needs further development and experiment. Problem analysis: (1) Story telling and experience. The creation purpose of traditional film and television animation is to tell stories and convey emotions. However, VR animation is to allow the audience to experience a different story from the real world and achieve another nice emotional experience. Thus, the focus of creation should be on the "experience". (2) The paradigm of narration and interaction. Only natural interaction can realize natural emotional experience. Natural interaction should be integrated into narration, so we cannot only focus on the function and form of interaction, but ignore narration. Meanwhile, we can't ignore the interaction for the sake of narration. Only the organic integration of narrative and interaction can reflect the modernity, advancement and extensibility of VR animation.

Research on Emotional Interactive Design of VR Animation

Emotional Expression of Interactive Elements. The emotional interactive elements take emotional design as the theoretical basis and film and television art creation language as the means. It integrates the basic methods of interactive design and analyzes many elements affecting emotional expression in VR animation creation. Based on professor Norman's theory of emotional design, we divide the interactive elements of VR animation creation into three levels: (1) Emotional expression of interactive elements in instinct aesthetic level; It is an emotional interactive element based on audio-visual language, including lens and picture, light and color, sound, editing and other contents. (2) Emotional expression of interactive mode in behavioral functional level; It belongs to the "explicit interaction" with functional nature in the process of emotional interaction, namely, the interactive interface. It is closely related to individual emotional needs and subjective attitudes, and has become the core form to solve emotional interaction. (3) Emotional expression of interactive experience in content experiential level; Its expression technique with narration as the core belongs to "implicit interaction", which has a very important impact on emotional interaction.

Research on Emotional Interactive Design Process in VR Animation Creation

(1) Transformation of emotional needs

In interactive design, emotional elements are mainly reflected as instinctive, behavioral and reflective emotion, which form the transformation of emotional needs in the form of continuous progressive; They can also form the transformation of emotional needs under some preset "emotional triggering mechanism"⁵. The transformation of emotional needs is an inevitable problem in the narration and interactive process of VR animation. To deeply analyze and understand the transformation of emotional needs plays an extremely important role to achieve natural, deep emotional experience.

(2) Hierarchical optimization of emotional interaction

⁴ Liu Lin. Research on Emotional Experience Design Based on Interface Interactive Design[J]. Art and Design (Theory), 2018(01).

⁵ Wei Xiaochen. Emotional Analysis in Human-computer Interactive Design[J]. Industrial Design, 2019(03).

VR emotional interactive design is an interactive design method and application for complex emotional information, which cannot be simply considered in the way of single thread. At present, the trend of interactive hierarchy is "information element - tile layout - three-dimensional hierarchical layout". For interactive hierarchical layout, there are azimuth, stacked, shifted, display and tiled types. We can introduce such an interactive hierarchical layout into VR animation interaction and serve the emotional interactive design. The research on Interactive hierarchical optimization can establish accurate and efficient emotional interactive channels in human-computer interaction in VR space, effectively organize emotional interactive information and arrange emotional interactive elements. Thus, it is significant for deep and effective emotional interactive design.

(3) Organization of emotional interactive elements

Emotional interactive elements are reflected in VR animation as the elements that can promote or influence emotional experience. It includes light and shadow interactive point, props interactive point, sound interactive point, plot interactive point, interface interactive point, etc. From the various elements of film and television animation, it effectively helps to advance the story. Thus, which elements can serve emotional expression, which elements can interact, whether they all need to interact, when they interact, how often they interact, and how they affect emotional experience are particularly important for VR animation.

(4) Walk-through of emotional interactive process

The traditional animation creation does not have the "walk-through", but it is necessary in the interactive design. It can check whether the developed products and the design draft are different, and then optimize products. The walk-through of VR emotional interactive design starts from the development of "instinct emotion-reflective emotion-behavioral emotion". The walk-through is to check the effectiveness of the organization and layout of the preset emotional interactive elements, find problems and optimize them. This enables the audience to have psychological feelings and a kind of unconscious intuition at the first time. Through associating and thinking, they can have a high-level and deep psychological feelings to some potential information, and realize a deep emotional experience.

Research on Emotional Interactive Design Methods for VR Animation Creation. Because of different stories, themes, topics, characters, and expression methods, the emotional interactive design in VR animation creation cannot be generalized. It is more important to take the emotional process of "triggering emotion, establishing emotion, affecting/feedback emotion, enhancing emotion, and emotional resonance" as the basic path. It is necessary to study the corresponding emotional interactive modes for different emotional stages, determine the basic process of emotional interactive design, and explore the basic methods to realize emotional interaction, like how to establish emotional interactive guidance, the correct application of emotional triggering mechanism, how the plot interactive point form the narrative chain, etc. All of these can form the research of emotional interactive design method.

Conclusion

At present, there is a lack of practical research on VR animation interaction design in domestic and foreign academic circles and industries, and relevant information is scarce. The complexity of emotion and the variability of affective elements in emotional interactive design bring some difficulties to design⁶. Concerning the basic issues of emotional interactive design in VR animation creation, we start from the perspective of emotional designing theory. Through interactive design, we can effectively enhance the audience's emotional experience, explore the deep emotional needs of VR animation, enrich and develop the theory of emotional interactive design. This has provided a more reasonable theoretical method for future emotional interactive design of VR animation.

⁶ Liu Ruixue. Research on Effects of Flow Experience and Empathy in Immersive Virtual Environment[J]. Journal of Curriculum and Instruction, 2019(04).

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