### Original Research Article

# Research on the application of digital twin technology in the creation of digital new media virtual scenarios and the simulation of user behaviors

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*Abstract:* Digital twin technology, as an important tool for the integration of virtual and reality, is increasingly widely used in the field of new media. Through accurate virtual scene construction and intelligent user behavior simulation, digital twin technology provides new technical support for new media content creation, personalized recommendation and user interaction experience enhancement. This study explores the application of digital twin in virtual scene creation and user behavior simulation, and analyzes its practical value and development potential in digital new media environment. With the advancement of artificial intelligence, big data and other technologies, digital twins show important advantages in improving the accuracy of virtual scenes, enhancing user immersion and optimizing personalized services. The continuous development of this technology will promote the development of new media in the direction of more intelligent and personalized, and further enhance user participation and media communication effects.

Keywords: Digital twin; Virtual scene; User behavior simulation; Intelligent interaction

### 1. Introduction

As an important means for the deep integration of virtual and reality, digital twin technology shows a broad application prospect in the field of new media. With the continuous evolution of the digital communication mode, the accuracy of the construction of the virtual scene and the user interaction experience have become the key factors affecting the effect of content dissemination<sup>[1]</sup>. Through digital twin technology, a highly realistic virtual environment can be constructed, realizing real-time mapping and dynamic optimization of the physical world, and improving the immersion and interactivity of the content. Advances in user behavior simulation technology make personalized recommendation and intelligent interaction more accurate, which helps optimize the new media content distribution and interaction mode. The collaborative development of artificial intelligence, cloud computing and big data analysis provides technical support for the application of digital twins in new media. Research on the application of digital twin technology in virtual scene creation and user behavior simulation can promote the intelligent development of the new media industry and improve the efficiency of digital content distribution and user experience.

# **1.1. Digital twin facilitates the development of new media, virtual scene shapes immersive experience**

#### 1) Digital twins improve the accuracy of virtual scene construction and enhance user immersion

Digital twin technology effectively improves the construction accuracy of virtual scenes through highprecision modeling and real-time data fusion, making the virtual environment more realistic and interactive<sup>[2]</sup>. Based on multimodal data acquisition, digital twin can accurately reconstruct the physical space, refine the details of the scene, and ensure that the morphology, texture, and dynamic changes of the virtual objects conform to the physical laws. Driven by data, the virtual scene can realize adaptive optimization, adjust the environmental parameters in combination with user behavioral data, and improve the ability of personalized adaptation. Relying on real-time simulation technology, the system can dynamically update the state of the scene, so that the user's perception in the virtual space is more coherent, reducing the sense of fragmentation of the immersion experience. With the development of artificial intelligence and computer vision, digital twin can further enhance the intelligence of scene interaction, realize accurate feedback and response, thus enhancing the user's sense of immersion and making the virtual scene more realistic and application value.

# 2) User behavior simulation helps personalized recommendation and optimizes intelligent interaction experience.

User behavior simulation accurately captures user preferences and interaction patterns through deep learning and big data analysis, providing data support for personalized recommendations. Based on users' browsing trajectory, operating habits and interest tendencies, the system can establish a behavioral feature model to achieve dynamic adaptation and accurate delivery of content. Intelligent recommendation algorithms combine real-time data to adjust the content presentation, so that users can get a more suitable immersive experience. In the process of human-computer interaction, digital twin technology can simulate user response, optimize interface layout and interaction logic, and improve the intelligence and naturalness of system feedback. With the optimization of the behavioral simulation model, the accuracy of personalized recommendations continues to improve, making the interaction process more intelligent, personalized and efficient, thus enhancing user stickiness and improving the user experience and content dissemination effect of the new media platform.

# **1.2.** Optimization strategy to promote technological upgrading, intelligent drive to shape the future scene

#### 1) Integrate multi-source data to improve the accuracy of virtual scene modeling

The high-precision construction of virtual scenes relies on the deep fusion of multi-source data, and by integrating multi-modal information such as vision, speech, motion capture, etc., the digital twin technology can improve the detail reproduction and dynamic adaptability of the scene <sup>[3]</sup>. The collaborative processing of multi-source data makes the virtual environment have higher spatial consistency and behavioral logic rationality. Based on sensor networks and IoT technologies, real-time data streams can be used to dynamically adjust scene parameters to ensure high-precision mapping of virtual and real environments. In terms of computing architecture optimization, cloud computing and edge computing work together to improve data processing efficiency, reduce latency, and achieve smoother scene rendering and interactive response. Through efficient data fusion strategies, virtual scene modeling is not only more visually realistic, but also more intelligent in the interaction experience, laying a solid foundation for immersive new media applications.

For example, a museum uses digital twin technology to build a virtual exhibition hall, collecting 3D data of exhibits through high-precision laser scanning and photogrammetry technology, combining with infrared sensors to capture changes in ambient light, so that the material, shadow and reflective effects of the virtual exhibits are highly reproducible to the real physical characteristics. The fusion of audio data enables the audience to have a similar auditory experience to that of a field visit in the virtual space, for example, the audio explanation next to the exhibits will automatically adjust the volume and direction according to the user's moving track. With the help of edge computing technology, the system can load the corresponding scenes in real time when the user enters different exhibition areas to ensure smooth interaction. This multi-source data-driven modeling not only improves the authenticity of the virtual scene, but also enhances the immersive experience, enabling remote

viewers to get close to the reality of the exhibition experience.

## 2) Intelligent algorithms to optimize user behavior simulation and enhance human-computer interaction experience

Intelligent algorithms play a key role in user behavior simulation, accurately predicting user operation patterns and optimizing human-computer interaction logic through deep learning and reinforcement learning techniques [4]. Based on historical interaction data, the intelligent model can construct a user behavioral portrait, analyze individual preferences and operating habits, and realize personalized interaction strategies. Reinforcement learning mechanism allows the system to continuously adjust the response mode, improve the adaptability of the virtual environment to user input, and make the interaction more natural and smooth. The integration of computer vision and natural language processing technology enables the system to understand the user's visual focus and verbal commands, realizing an interactive experience that is more in line with the laws of human cognition. In multi-user interaction scenarios, the intelligent algorithm can simulate the behavioral characteristics of different users, optimize the group interaction mode, and improve the authenticity of the collaborative experience. With the improvement of model training accuracy, the degree of intelligence of human-computer interaction is continuously enhanced, promoting the deep application of digital twin technology in the field of new media.

For example, a large e-commerce platform uses a deep learning model to analyze the user's historical consultation records and build a personalized semantic understanding model so that the virtual customer service can accurately identify the user's intentions. When users ask for product recommendations, the system not only matches based on keywords, but also combines the user's browsing history, purchasing habits and current interaction context to provide highly relevant personalized recommendations. Reinforcement learning mechanism enables the customer service system to continuously adjust the response strategy in multiple rounds of dialog, for example, when the user expresses doubts, the system can automatically adjust the tone of voice to guide the user to a more in-depth conversation. In addition, computer vision technology enables virtual customer service to recognize user expressions and gestures in the video interaction mode and adjust the communication mode at the right time. This intelligent algorithm-driven optimization makes virtual customer service closer to the service mode of real customer service, and improves user satisfaction and interaction naturalness.

# 3) Expanding application scenarios and promoting the deep integration of digital twins and new media

The application of digital twin technology is expanding from industrial manufacturing to the field of new media, promoting the innovation of content production, dissemination and interaction modes through the deep integration of virtual reality, artificial intelligence and big data analysis. In digital content creation, digital twins can build high-precision virtual studios and realize real-time dynamic rendering, making news broadcasting, film and television production and other scenes more intelligent and immersive. In the field of social and marketing, digital twins can combine user behavior simulation to create highly personalized immersive experiences, enhancing the accuracy and interactivity of brand communication. Through the construction of virtual digital people, intelligent anchors, virtual idols and other new forms of media content are gradually maturing, enabling users to obtain a more immersive interactive experience.

In the live broadcast of sports events, the application of digital twin technology significantly improves the audience's interactive experience and sense of immersion. An international soccer event used digital twin technology to build a holographic virtual stadium, through high-precision 3D modeling and real-time data streaming, enabling viewers to freely switch between different viewing perspectives, including God's perspective, player's perspective and even referee's perspective. Combined with artificial intelligence analysis, the system can generate real-time key data of the game, such as players' running track, passing success rate, shooting accuracy, etc., providing viewers with personalized game analysis. Combined with natural language processing technology, the virtual commentary system automatically generates professional commentary content according to the game progress, enhancing the viewing experience. In terms of social interaction, viewers can participate in the virtual sports community through the digital twin environment and communicate with global fans in real time. This deeply integrated application model not only expands the communication mode of sports media, but also promotes the evolution of new media content in the direction of immersion and personalization.

### 2. Conclusion

The application of digital twin technology in new media virtual scene creation and user behavior simulation provides a new technical path for digital content production, personalized recommendation and human-computer interaction optimization. Through the fusion of multi-source data and the optimization of intelligent algorithms, the construction precision and interaction experience of virtual scenes are significantly improved, laying the foundation for the immersive development of the new media industry. Advances in user behavior simulation technology have made the content distribution and interaction mode more accurate and intelligent, improving user engagement and satisfaction. With the in-depth development of artificial intelligence, blockchain and meta-universe technology, digital twins will show broader application prospects in the field of new media. In the future, the data collection and analysis system should be further improved, privacy protection and security supervision should be strengthened, and the in-depth integration of technology and content innovation should be promoted, so as to realize a more intelligent and personalized digital media ecosystem, and to enhance the efficiency and influence of digital communication.

### About the author

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