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# *Innovation and development strategy of interactive entertainment industry driven by artificial intelligence*

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***Abstract:*** This paper discusses the transformation and development of interactive entertainment industry driven by artificial intelligence. With the rapid development of artificial intelligence technology, it plays an increasingly important role in various fields of interactive entertainment industry. In the game industry, AI has realized the intellectualization of game characters and personalized game experience, and improved the level of game production and player satisfaction. In the film and television industry, AI has brought automated editing and special effects synthesis, as well as virtual character and scene generation, bringing a new visual experience to the audience. In the music industry, AI has shown great potential in music creation, recommendation and performance. However, AI has also brought a series of challenges to the interactive entertainment industry, such as the difficulty of understanding 3D environment and Chinese semantic processing in technical problems. In response to these challenges, some coping strategies are proposed, such as improving the accuracy of the model and strengthening the cooperation between human and AI. In short, AI has brought profound changes to the interactive entertainment industry. In the future, we should continue to explore its development direction in order to achieve continuous innovation and progress in the industry.

## 1. Introduction

With the rapid development of science and technology, artificial intelligence technology is penetrating into various industries at an unprecedented speed, and the interactive entertainment industry is no exception. In recent years, artificial intelligence has been applied more and more widely in the interactive entertainment industry. From game development to film and television production, from music creation to virtual reality experience, artificial intelligence is reshaping the pattern of the interactive entertainment industry.[1]

At present, the application of artificial intelligence in interactive entertainment industry has achieved remarkable results. For example, in game development, AI can automatically generate game scenes, characters and plots, which greatly improves the efficiency and quality of game development. In film and television production, artificial intelligence can realize automatic editing, special effect synthesis and virtual character generation, bringing more shocking visual experience to the audience. In music creation, artificial intelligence can analyze music trends, provide creative inspiration for

musicians, and even automatically generate music works.

However, although AI has broad application prospects in the interactive entertainment industry, it also faces some challenges. For example, the content generated by AI may lack emotion and creativity, and it is difficult to meet the emotional needs of the audience. In addition, the application of AI may also cause some ethical and legal issues, such as copyright ownership, data security, etc.

This paper aims to deeply analyze the application status of artificial intelligence in interactive entertainment industry, explore the challenges it faces, and put forward the corresponding development strategies. Through a comprehensive analysis of the application of artificial intelligence in the interactive entertainment industry, it can provide useful reference for industry practitioners and promote the sustainable development of the interactive entertainment industry in the era of artificial intelligence. Specifically, this study will focus on the following aspects:

First of all, this paper analyzes the specific applications of AI in various fields of interactive entertainment industry, including games, film and television, music, virtual reality, etc., and discusses its positive impact on the development of the industry.[2]

Secondly, the challenges faced by AI in the interactive entertainment industry, such as lack of emotion and creativity, ethical and legal issues, are deeply studied, and the corresponding solutions are put forward.

Finally, combined with the actual case, this paper puts forward the development strategy of interactive entertainment industry driven by artificial intelligence, which provides guidance for the future development of the industry.

## 2. Theoretical basis

### 2.1 Technical principle of artificial intelligence

#### 2.1.1 Application of machine learning in games

Machine learning is widely used in games. Taking the intelligent game characters as an example, machine learning can create NPC with multiple behaviors to learn a large number of human behaviors and make the interaction with human more natural. For example, in some games, NPC can make different responses according to the player's behavior and choice to improve the playability and interest of the game. In addition, machine learning can also test the game before it is released to ensure that the game can go smoothly. When the number of human players is small, agent can also be used to replace human players. Machine learning can also be used for match making to find suitable players to play games together, optimize game time and player pairing, and maximize the use of game time.

#### 2.1.2 Deep learning and music creation

Deep learning also plays an important role in music creation. Deep learning technology can provide creative inspiration for musicians by analyzing music trends. For example, using specific technologies and frameworks, you can create your own original music without really understanding any music theory. WaveNet is a primitive audio generation model based on deep learning, developed by Google deepmind. Given a sample sequence, it attempts to predict the next sample and generate new music samples from the original data distribution. The long-term and short-term memory (LSTM) model is also a variant of recurrent neural networks (RNNs), which can capture the long-term dependence in the input sequence, and has a wide range of applications in the automatic generation of music.[3]

## 2.2 Characteristics of interactive entertainment industry

### 2.2.1 User interaction and AI value

Artificial intelligence plays an important role in improving user interaction. For example, in remote video conference, artificial intelligence can provide better visual effects through intelligent camera control. Through face recognition and pose recognition technology, the camera angle and focus are automatically adjusted to ensure that the participants are always in the picture and provide the best visual effect. In the game, AI can create more intelligent NPC and interact more naturally with players. In interpersonal interaction, natural language processing promotes smooth communication. Artificial intelligence can analyze text and language, identify emotions and emotions, and improve empathy, empathy and communication effect.[4]

### 2.2.2 Satisfaction of personalized needs

Taking the personalized recommendation system as an example, AI can infer users' preferences by analyzing users' behavior, content characteristics, social relationships and other information, and provide personalized information recommendation. For example, in the view personalized recommendation of wechat public platform, users' reading, attention, sharing and other information in wechat are combined with deep learning algorithm to recommend the most interesting articles for users. At the same time, it also has access to Tencent video, penguin, vertical small video and other content, greatly enriching the diversity of recommended content. The recommendation system usually adopts the classic three-tier structure of recall, rough sorting and fine sorting. The number of candidate sets processed in each stage decreases layer by layer, followed by a layer of mixed heterogeneous content. Considering that the click through rates and optimization objectives of different content sources are different, it is difficult to compare them together. At present, the reinforcement learning model is introduced at the mixed row side to optimize long-term benefits and achieve fast real-time feedback. Recall is mainly responsible for selecting 10000 level candidate sets from millions of candidate sets to rough sorting, including interest portraits, collaboration, public accounts, social and other categories of recalls. Sorting is mainly divided into two stages: fine sorting and rough sorting. In the fine sorting stage, the itemlist in the rough sorting candidate pool needs to be scored. This score is the prediction of each user's click probability of candidate articles, that is, CTR estimation. In large-scale CTR estimation system, logistic regression, FM (factorization machines) and wide&deep model play an important role in different stages.

## 3. Application of artificial intelligence in interactive entertainment industry

## 3.1 Applications in the game industry

Through the cases of Tencent, Netease and other companies, this paper analyzes the application of AI in game production, role intelligence and other aspects.

### 3.1.1 Intelligent game characters

In the game industry, AI enables game characters to learn and adapt themselves. For example, in some Tencent games, using machine learning algorithms, game characters can constantly adjust their strategies and actions according to the changes of players' behavior patterns and game scenes. When a player adopts a specific tactic, the game character can analyze the characteristics of this tactic and find the corresponding countermeasures. This self-learning ability makes the game characters more intelligent and increases the challenge and interest of the game. Netease's games have also made

breakthroughs in role intelligence. Through in-depth learning technology, game characters can imitate the operating habits of human players and improve the interaction with players. For example, in some competitive games, game characters can learn strategies and skills of excellent players by analyzing a large number of game data, so as to perform better in the game.[5]

### 3.1.2 Personalized game experience

Taking intelligent recommendation of game platform as an example, AI has greatly improved the satisfaction of players. Tencent game platform uses artificial intelligence technology to recommend personalized game content for players according to their game history, preferences and behavior patterns. For example, if players often play shooting games, the platform will recommend some new shooting games or activities related to shooting games. Netease game platform recommends games suitable for players to play with friends by analyzing the social relationships of players and the interaction of game communities. This personalized recommendation method not only improves the efficiency of players in discovering new games, but also increases the interaction and stickiness between players and the platform. In addition, AI can also adjust the difficulty and challenge of the game according to the level and progress of the player, providing a more personalized game experience for the player.

## 3.2 Application in film and television industry

Taking Ali's film trailer production and Netease's virtual role generation as examples, this paper discusses the role of artificial intelligence in film and television production.

### 3.2.1 Automatic editing and special effect synthesis

Artificial intelligence has greatly improved the efficiency and quality of film and television production. Taking Ali as an example, by using artificial intelligence technology to make movie trailers, we can automatically analyze the plot, picture, music and other elements of the movie, and quickly edit wonderful Trailer clips. Artificial intelligence algorithm can automatically identify the key plots and climaxes in the film, and combine these clips to form an attractive Trailer. At the same time, AI can also adjust the style and content of the trailer according to different target audiences and publicity channels, so as to improve the pertinence and communication effect of the trailer. In terms of special effects synthesis, artificial intelligence can automatically generate realistic special effects, such as flame, smoke, explosion, etc., which greatly reduces the time and cost of artificial special effects. For example, in some blockbusters, the special effects generated by artificial intelligence are perfectly integrated with the real scene, bringing a shocking visual experience to the audience.

### 3.2.2 Virtual role and scene generation

The virtual characters and scenes created by AI have great attraction to the audience. Netease has made remarkable achievements in the generation of virtual characters. Using artificial intelligence technology, it can quickly generate realistic virtual characters, which have rich expressions and movements and can interact naturally with actors. In film and television production, virtual characters can undertake some difficult actions and dangerous scenes, reducing the risks and production costs of actors. At the same time, virtual characters can also be customized according to the needs of the plot to meet the needs of different types of films. In terms of scene generation, AI can quickly generate various fantasy scenes, such as alien worlds and ancient castles, according to the director's requirements. These virtual scenes can not only save the cost and time of field shooting, but also bring a new visual experience to the audience.

### 3.3 Application in music industry

Analyze the application of AI in music creation, recommendation and performance, such as the development of AI music model.

#### 3.3.1 Music creation and generation

Artificial intelligence has brought new vitality to the music industry by learning a variety of music styles and generating new works. For example, some AI music models can analyze a large number of music works, learn the characteristics and laws of different music styles, and then automatically generate new music works according to users' needs and input themes. These works can cover a variety of musical styles, such as pop, rock, classical and so on. At the same time, AI can continuously optimize its own creative process and improve the quality and satisfaction of works according to the feedback and evaluation of users. For example, some music creation software can adjust the rhythm, melody and harmony of music in real time to meet the personalized needs of users by using artificial intelligence technology.

#### 3.3.2 Personalized music recommendation

Taking the music platform as an example, AI provides users with personalized music experience by analyzing users' listening history, preferences and behavior patterns. For example, Tencent music platform uses the deep learning algorithm to recommend music works with similar styles for users according to their listening records and collection lists. At the same time, the platform can also recommend suitable music according to the user's mood and scene. For example, when users are exercising, the platform will recommend some music with a lively rhythm and vitality; When users are relaxing, the platform will recommend some soft and soothing music. Netease cloud music platform recommends users' favorite music and popular music works by analyzing users' social relations and interaction in the music community. This personalized music recommendation method not only improves the efficiency of users' discovering new music, but also increases the interaction and stickiness between users and the platform.

## 4. Challenges and Countermeasures brought by artificial intelligence

### 4.1 Technical challenges

#### 4.1.1 Challenges in 3D

In terms of 3D modeling, AI is currently facing many challenges. Although AI technology has made significant progress in improving 3D scanning and reconstruction, there are still difficulties in the geometric processing of complex models. For some complex models with a large number of details and data, AI algorithms still have a long way to go in the efficient processing of these geometric data to ensure the accuracy and quality of the model. For example, in game development, high-precision 3D scene modeling needs to process a large amount of geometric information, and artificial intelligence cannot fully meet the requirements in ensuring the integrity and accuracy of the model.

In terms of physical engine, AI also faces challenges. The realization of real physical simulation is crucial for the interactive entertainment industry, especially in games and virtual reality experience. However, the current artificial intelligence technology is still insufficient in accurately simulating physical phenomena, such as object collision, gravity and fluid motion. This may lead to unreal physical effects in the game and affect the players' sense of immersion.

### 4.1.2 Chinese semantic processing problems

Taking the "characterglm" model as an example, the hallucination problem of artificial intelligence is more prominent in Chinese semantic processing. Although the characterglm model can set a specific personality when communicating with humans and has a certain degree of humanity, the response may still be inconsistent with the actual situation in the process of dialogue. For example, wrong information or unreasonable reasoning may occur when answering questions in certain fields. This shows that AI needs to be improved in understanding Chinese semantics and knowledge accuracy. In addition, the complexity and diversity of Chinese semantics have also brought challenges to AI. There are a lot of phenomena in Chinese, such as polysemy, polysemy, part of speech change and word meaning lending, which make AI prone to confusion and errors in understanding and processing Chinese semantics.

## 4.2 Coping strategies

### 4.2.1 Improve the accuracy of the model

In order to reduce the hallucinations of artificial intelligence and improve its accuracy, a variety of strategies can be adopted. First, by increasing the diversity and scale of training data, the ability of AI model to understand and adapt to different situations can be improved. For example, collect more Chinese text data in different fields and styles, and conduct more comprehensive training on the model. Secondly, using more advanced algorithms and technologies, such as reinforcement learning and transfer learning, can improve the learning ability and generalization ability of the model. For example, the reinforcement learning algorithm is used to make the model constantly adjust its response strategy in the interaction with users to improve the accuracy of the response. In addition, the manual review and feedback mechanism can be introduced to detect and correct the wrong answers of the model in time and continuously optimize the performance of the model.

### 4.2.2 Strengthen the cooperation between human and AI

In the interactive entertainment industry, it is very important to balance the relationship between artificial creativity and artificial intelligence. On the one hand, AI can provide a lot of creative inspiration and auxiliary tools for creators. For example, in music creation, AI can analyze music trends and provide creative inspiration for musicians; In film and television production, AI can automatically generate special effects and virtual characters, providing more creative possibilities for directors and screenwriters. On the other hand, artificial creativity is still indispensable in the interactive entertainment industry. Human creators have unique emotional, creative and aesthetic abilities, which can inject soul and depth into their works. Therefore, strengthening the cooperation between artificial and AI can achieve complementary advantages and jointly promote the development of interactive entertainment industry. For example, in game development, human designers can be responsible for the overall architecture and plot design of the game, while AI can be responsible for generating game scenes and characters to improve the efficiency and quality of game development. At the same time, the quality and artistry of works can be ensured by manually reviewing and adjusting the content generated by AI.

## 5. Conclusion

Artificial intelligence has had a profound impact on the interactive entertainment industry. In the game industry, it has realized the intellectualization of game characters and personalized game experience, and improved the interest of the game and the satisfaction of players. In the film and

television industry, automatic editing and special effects synthesis have improved the production efficiency and quality, and the generation of virtual characters and scenes has created fantastic visual effects and attracted the attention of the audience. In the music industry, music creation and generation have brought new vitality. Personalized music recommendation meets the personalized needs of users.

However, AI also faces some challenges in the interactive entertainment industry. In terms of technology, there are still difficulties in modeling and physical engine in 3D field, and Chinese semantic processing is also facing difficulties. To meet these challenges, we can improve the accuracy of the model and strengthen the cooperation between human and AI.

In the future, the combination of artificial intelligence and interactive entertainment industry can be studied from the following directions. First, further explore the application of artificial intelligence in 3D modeling and physical engine, improve the accuracy of the model and the authenticity of physical simulation, and bring a more immersive feeling for the game and virtual reality experience. For example, the deep learning algorithm can be used to optimize the geometric processing of 3D models to improve the details and accuracy of models; At the same time, strengthen the simulation research of physical phenomena to improve the physical effect in the game.

Secondly, we should deeply study the Chinese semantic processing technology to improve the ability of AI to understand and process Chinese. We can combine linguistic knowledge and deep learning technology to develop a more suitable semantic understanding model for Chinese and reduce the occurrence of hallucinations. At the same time, we should strengthen the research on Chinese polysemy, part of speech changes and other phenomena, and improve the accuracy and flexibility of AI in processing Chinese semantics.

In addition, it can also strengthen the innovative application research of artificial intelligence in the interactive entertainment industry. For example, explore the application of artificial intelligence in interactive film and television, intelligent music performance and other aspects, and bring more novel entertainment experience to users. At the same time, combining artificial intelligence and blockchain technology, we can solve ethical and legal issues such as copyright ownership, and provide protection for the sustainable development of interactive entertainment industry.

In a word, the application prospect of AI in interactive entertainment industry is broad, and future research will continue to promote the innovation and development of interactive entertainment industry.

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