The Application and Development of Digital Humans in Media Live Streaming

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Abstract: Digital human live streaming, as an emerging field in the media industry, is reshaping the way content is produced and disseminated. This article analyzes the application forms and advantages of digital humans in such fields as news broadcasting, e-commerce live streaming, and variety show hosting, and elaborates on the technological paths of full-chain AI-driven and partially AI-driven approaches. The article also briefly analyzes the current development status and existing problems of digital humans in media live streaming, and puts forward prospects for their future development direction.

1. Introduction

Digital humans refer to virtual images with human appearance, mental elements, and behavioral characteristics generated through technologies such as computer graphics and artificial intelligence[1]. As an important means of information dissemination, media live streaming, by introducing virtual digital human technology, can not only enrich the forms of content but also improve the dissemination efficiency and audience engagement[2]. In recent years, with the breakthroughs in generative artificial intelligence (AIGC) technology, virtual digital humans have shown broad application prospects in the field of media live streaming.

2. Applications of Virtual Digital Humans in Media Live Streaming

At present, digital humans have been widely applied in various fields such as news, e-commerce, and entertainment. Their commercial value in media live streaming is becoming increasingly prominent, and the market size continues to rise. The following is an analysis of the specific application forms and advantages of digital humans in each of these fields.

2.1 News Broadcasting

As news anchors, digital humans are not restricted by time and space and can be on standby at any time. Their role is particularly significant in reporting emergency incidents, greatly enhancing the timeliness of news broadcasts. Digital humans can quickly convert written manuscripts into clear and natural speech through programs and algorithms, generating news broadcast content rapidly with a zero error rate, thus avoiding the slips of the tongue or misinterpretations that human anchors might

make. In addition, the use of virtual digital humans can save a great deal of labor costs and reduce the cost of news production. It also enables news broadcasts to switch freely between different scenarios and even allows them to enter dangerous or hard-to-reach scenes to complete reports. Moreover, virtual digital humans can deliver news in multiple languages and styles, adjusting their appearances and costumes according to different scenarios, bringing innovative visual experiences to the audience[1].

2.2 E-commerce Live Streaming

The greatest advantage of using digital humans influencer in e-commerce live streaming is their ability to conduct non-stop live broadcasts 24 hours a day, 7 days a week. This significantly increases the duration of live streams and the exposure rate of products, enhances customers' parasocial interactions. Based on natural language processing and big data analysis technologies, digital human anchors can quickly retrieve product-related technical parameters. By referring to data of similar products in the market and combining with audience questions, they can generate targeted responses in real time, achieving personalized recommendations[2].

Digital human anchors can also enhance user interactivity and purchasing intent through methods such as virtual try-ons and storytelling marketing. In addition, the image of digital human anchors, which is precisely created according to the brand positioning, can always maintain a consistent style, improving the shopping experience. Compared with human anchors, digital human anchors do not require the payment of salaries, benefits, or training costs. Once the modeling and program development are completed, they can be used for a long time, greatly saving the live streaming costs for merchants.

2.3 Variety Show Hosting

Digital humans can either independently host variety shows or co-host alongside human presenters, introducing a novel format that enhances the technological appeal and innovation of the programs. This approach is particularly effective in capturing the attention of younger audiences. The appearance, costumes, and styles of digital humans can be tailored to align with the show's theme, catering to the fashion sensibilities of younger viewers. Additionally, virtual hosting can amplify the shows' topicality and engagement. As embodiments of the show's cultural IP or brand image, digital humans can effectively communicate specific cultural or brand values. From a long-term perspective, employing digital human hosts can significantly reduce labor costs by eliminating the need for high salaries and training expenses associated with personnel changes. Moreover, virtual hosting mitigates the risks of program delays or additional costs arising from unforeseen circumstances, such as illness or accidents involving human hosts. However, variety shows demand a high level of interactive capability from virtual hosts, and there remains a noticeable gap before achieving fully mature and seamless application in this domain[3].

3. Technological Paths for Virtual Digital Human Live Streaming

There are mainly two technological paths for using digital humans in media live streaming: one is full-chain AI-driven, and the other is partially AI-driven (modeling and motion capture need to be completed manually, and the interaction part is driven by AI).

3.1 Full-Chain AI-Driven

The full-chain AI-driven technology enables digital humans to autonomously execute movements, expressions, language, and interactions entirely through AI, eliminating the need for human intervention in complex processes. This form of live streaming can be categorized into three distinct types. The first type involves utilizing AI to automatically generate desired movements, expressions, and voices from pre-recorded real-person videos, which are then integrated with virtual backgrounds to broadcast fixed content. This method is commonly employed in news live streaming. The second type builds upon the first by incorporating basic interactive features, such as answering questions. This approach is particularly suitable for e-commerce live streaming aimed at product promotion.The third type entails creating digital human models and animations using AI, and then leveraging machine learning, natural language processing (NLP), and text-to-speech (TTS) technologies to facilitate voice and motion interactions. This method's strength lies in its capacity to respond to audience inquiries and commands in real time, making it ideal for hosting variety shows or engaging in offline interactions.

3.2 Partially AI-Driven

Currently, due to the limited scope and lack of realism in AI-generated digital avatars, highly realistic customized digital humans still require the use of 3D modeling software. By employing motion capture and facial expression capture technologies, more authentic movements and expressions can be achieved, offering greater flexibility. The interactive aspects align with full-chain AI technology, enabling intelligent interactions through AI recognition, AI content generation, and AI voice interaction[3]. It is evident that this approach incurs higher costs and involves more complex technology, with the effectiveness of the digital human heavily reliant on manual modeling capabilities and motion capture techniques[4]. However, the advantage of this method lies in the more lifelike and natural appearance and movements of the digital human, closely resembling a real person. This makes it particularly suitable for scenarios demanding high visual quality and natural motion, such as premium brand promotion and virtual idol live streaming.

4. Analysis of the Current Application Status of Digital Humans in Media Live Streaming

In recent years, digital human technology has made remarkable progress in aspects such as image simulation, motion capture, and voice synthesis. This has made the images of virtual digital humans more and more realistic, their movements more natural and smooth, and their interaction capabilities significantly enhanced, enabling them to better meet the needs of media live streaming. The application scenarios of virtual digital humans have also been continuously expanding, gradually extending from news broadcasting and e-commerce live streaming to multiple fields such as variety entertainment, government services, education, and medical care. The commercialization process of live streaming is also accelerating.

However, there are still some problems in using digital humans for media live streaming. Firstly, the technological cost is extremely high. The research, development, and operation of virtual digital humans involve a large amount of technical investment, which is difficult for small media organizations and enterprises to afford. Secondly, there is a lack of authenticity in appearance and behavior. Despite significant technological progress, virtual digital humans still have gaps compared with real humans in details such as facial micro-expressions and the natural smoothness of body movements. The depth and breadth of interaction with the audience need to be improved, which is likely to make the audience feel a sense of "incompatibility", affecting the viewing experience, and may even trigger a sense of unfamiliarity and resistance among the audience. Therefore, it is an

effective way to enhance audience engagement to strengthen the personality, affinity and participatory storytelling ability of digital human.

5. Conclusion

Digital humans have been widely applied in multiple fields of media live streaming and have demonstrated great potential. Although there are still many technical deficiencies at present, which limit the visual experience of digital humans and their application scenarios, it is believed that with the continuous progress of relevant technologies and the gradual improvement of industry norms, virtual digital human live streaming is expected to become an important development direction in the media industry. In the future, research on digital humans should focus on the balance between technological innovation and artistic design, and explore sustainable business models to promote the in-depth application and healthy development of virtual digital human live streaming in the media field.

Acknowledgement

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