From Diva to Idol: Development and Status Quo of Virtual Humans in the Entertainment Industry

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Abstract. This paper focuses on analyzing the evolutionary process of virtual humans from virtual singers to virtual idols, exploring their development and commercial value in the entertainment industry to provide guidance for relevant investments. This research primarily uses a literature review method to sort out core technological innovation paths, revealing how artificial intelligence comprehensively enhances virtual humans' "IQ, EQ, and aesthetic quotient" and drives their transformation from functional roles to diversified entities. By comparing virtual singers, virtual idols, and real-life idols, it is evident that virtual idols have already achieved diversified economic benefits. In addition, market data shows that China's virtual human core market size is projected to reach 48.06 billion yuan by 2025, with the related industry scale reaching 640.27 billion yuan. Synthesizing the above, this paper will conclude that virtual idols already possess considerable commercial value and market potential, which will continue to be released with further technological development.

Keywords: Virtual people, Idol and Diva, Evolution of technology.

1. Introduction

With the evolution of technology, virtual humans have gradually entered public consciousness and begun competing with human idols. To better explore the potential market for virtual humans, this paper employs a literature review approach. By tracing the development history of virtual humans and comparing market performance between human and virtual idols, we aim to determine whether digital humans possess sufficient commercial value worthy of investment in the new era. Although constrained by issues like imprecise data and limited sample sizes that hinder direct visualization of virtual humans' commercial potential, we still demonstrate the vastness of this untapped market through illustrative methods. This analysis ultimately facilitates informed investment decisions by revealing the potential value of this emerging field.

2. Literature Review

Data indicates that China's core virtual human market size is projected to reach 48.06 billion yuan by 2025, with the surrounding market driven by virtual humans expected to reach 640.27 billion yuan. Analysts believe that virtual humans exhibit strong plasticity in content and peripheral products output, enabling continuous development of new trends to adapt to evolving times [1]. Thus, the industry demonstrates strong growth continuity and will maintain steady growth in the coming period.

In the consumer market, virtual idols demonstrate stronger brand empowerment capabilities. Taking the catering market as an example, virtual spokespersons are more effective at enhancing consumers' brand attitudes and sensory perception of products. French scholar Jean Baudrillard's consumption theory posits that consumption transcends mere material exchange, representing the authentic synthesis of objects and information within coherent discourse. As modern commodities have evolved beyond utilitarian and commercial purposes to prioritize "symbolic value", he emphasizes that goods are primarily consumed as cultural symbols rather than functional items. As a new producer of IP, virtual person and virtual IP as a new cultural phenomenon are constantly discovering their potential in the consumer market [2].

According to a 2024 survey comparing consumer intentions toward virtual idols and real-life idols indicates that virtual idols have already achieved fan-attracting capabilities comparable to real-life idols [2]3].

Comprehensive data confirms that virtual idols occupy a massive market and generate substantial economic returns. Combined with previous analysis, it is foreseeable that with technological advancements, virtual idols will exhibit far stronger companionship capabilities than real-life idols in the future, providing emotional value beyond that of real-life idols and thus holding greater investment potential.

3. Evolution of Virtual Human Technology

3.1. Definition and Classification

Virtual digital humans refer to virtual character forms constructed based on human design prototypes. They can be divided into two categories: digital humans and virtual humans. Digital humans are digital replicas or avatars based on real people, while virtual humans have completely fictional identities and appearances. As such, virtual humans themselves are digital artworks, offering greater creative freedom and plasticity in appearance, performance capabilities, and personality setting.

3.2. Core Technologies: Modeling, Driving, Rendering

The core technologies of virtual humans consist of three components: modeling, driving, and rendering. The driving module was the first to advance. By analyzing real-person audio data, virtual humans achieved imitation of real-person voices [4]. Upgrades in driving technology, combined with pseudo-holographic projection and motion capture technologies, drove innovations in modeling technology [5]. This enabled virtual humans to break the "dimension barrier", transitioning performances from “single auditory” to “audio-visual integration (see Figure 1 and Figure 2).

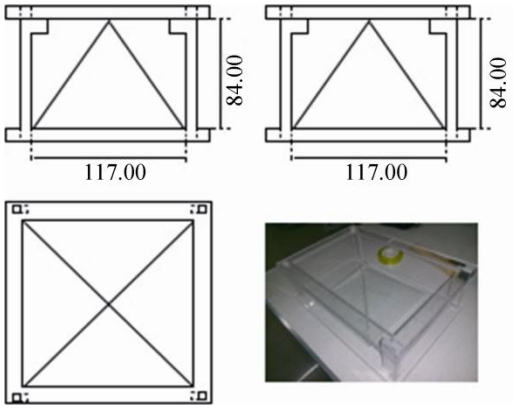

Figure 1. Single auditory

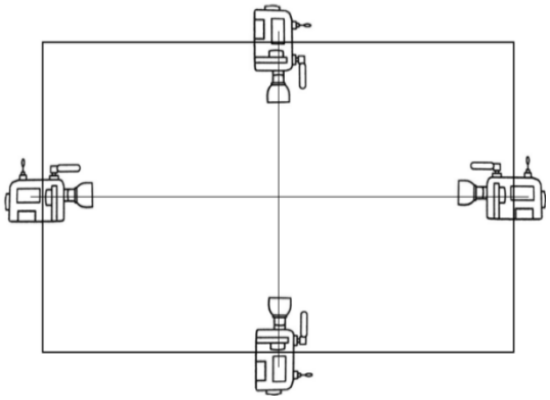

Figure 2. Audio-visual integration

Finally, the development of artificial intelligence (AI) technology promoted advancements in rendering technology. This enhanced virtual humans' "three intelligence" (IQ, EQ, and aesthetic quotient), enabling them to create literary and artistic works with distinct personalities and styles. With the continuous progress of these three technologies, virtual humans have gradually broken the constraints between virtuality and reality, integrating more deeply into the real world.

4. From Virtual Singer to Virtual Idol: A Comparative Analysis

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4.1. Technological Evolution

Voice and image are key elements of virtual singers, so technical focus has centered on these two areas:

Early virtual singers' voices were essentially debugging and processing of real-person audio, without true virtualization. With technological advancements, virtual singers' voices have evolved significantly. Taking the most popular music production synthesis software VOCALOID as an example, continuous upgrades from V2 to V6 have enabled virtual singers to break free from real-person limitations and create more natural works.

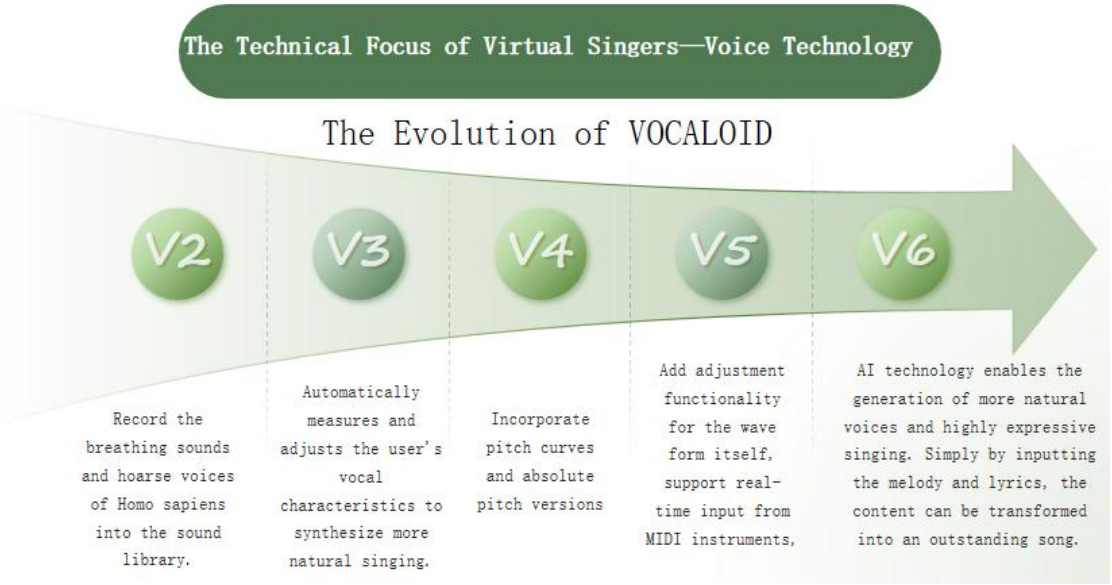

Figure 3. The Evolution of VOCALOID

Image Modeling: Limited by early modeling technology, virtual singers initially appeared as 2D characters. As technology progressed, their images evolved from 2D to 3D. For instance, Hatsune Miku, a virtual singer debuting in 2007, pioneered holographic projection performances at her 2010 concert, marking the moment virtual singers truly "descended" into reality.

The transformation of virtual singers into virtual idols is essentially a manifestation of advancements in AI technology. Early virtual singers, even when using 3D technology, relied on real-person data for core settings and could only perform according to pre-programmed scripts. However, with the development of AI, virtual idols have broken free from programmed limitations, enabling free expression, diverse interactions with audiences, and enhanced emotional value provision [6].

This has effectively expanded their audience base and achieved “breakthrough” development (see Figure 3).

4.2. Operational Models

The technical differences between virtual singers and virtual idols have led to distinct operation models. The core of virtual singer operations lies in attracting fans through continuous technological upgrades, while virtual idol operations focus on persona-building. Through targeted activity planning and program settings, virtual idols cater to diverse audience preferences, fostering a loyal fan base with strong consumption potential.

4.3. Economic Benefits

As a significant segment of the music market, virtual singers themselves generate substantial economic benefits. For example, Japan's Dream Arts saw a 308% year-on-year increase in profits after launching a virtual singer project, validating the commercial value of virtual singers. Meanwhile, Nikkei Shimbun data shows that the company's stock price and earnings rose simultaneously in the year following the project’s release, confirming the direct impact of virtual singer IPs on capital market attractiveness [7].

As an evolved form of virtual singers, virtual idols have expanded market boundaries, attracted broader fan bases, and achieved more diversified economic benefits. Two case studies illustrate this:

Japan's Bandai Namco transformed its virtual idol group from a project focused on music and animation sales into an IP-driven operation spanning games and merchandise. Economic benefits increased significantly: as early as 2015, a game based on this IP topped the App Store’s bestseller list, and an IP-themed movie released in June of the same year grossed 2.53 billion yen within three months. IP operations also generated unique commercial value [8].

China’s virtual idol Luo Tianyi similarly achieved a notable transformation, bringing significant economic benefits to its parent company, Shanghai He Nian [9]. The company’s strategies included: Strengthening technical cooperation with YAMAHA; Building partnerships with anime platforms, video websites, and portals for promotion; Collaborating on performances, such as Luo Tianyi's appearance at the 2020 CCTV "May Fourth" Youth Day Gala, where she performed the song Youth with youth volunteer representatives [10]. Coverage by official media outlets like Xinhua News Agency and People's Daily further enhanced Luo Tianyi's influence in the mainstream market. Notable brands such as Pechoin, KFC, Whisper, and Changan Automobile recognized her commercial value and partnered with her, achieving dual improvements in economic benefits and social influence.

5. Conclusion

Virtual humans boast broad development prospects and significant investment potential in the entertainment industry. Continuous advancements in core technologies have driven virtual humans to evolve from early functional roles to diversified subjects with IQ, EQ and aesthetic quotient, achieving the transition from virtual singers to virtual idols. The limitations of this study stem from constrained data sources and insufficient case representativeness, with experimental designs potentially lacking rigor. Future virtual human research should prioritize three key areas: deepening emotional interaction capabilities, expanding cross-domain integration applications, and enhancing autonomous learning systems. These advancements will enable more natural human-machine collaboration, ultimately driving trans-formative changes across various industries.

References

[1] Yun Xi. Production of Virtual IP under the Symbolic Consumption Theory. Nanjing Forestry University, 2024. DOI: 10.27242/d.cnki.gnjlu.2024.000427.

[2] Ai Jin, Lu Hongyuan, Wang Tingting. Virtual Idols or Real Stars? A Study on the Interactive Influence of Brand Personalities of Endorsers and Catering Brands on Consumers' Attitudes towards Brands. Tourism Forum., 2025, 18 (02): 89-104.

[3] Lü Desheng, Lin Zhiye, Kong Lu. Research on Character and Background Enhancement in Holographic Projection. Journal of System Simulation, 2017, 29 (11): 2717-2722.

[4] Jiao Deji, Luo Jianglin. Application of Motion Capture Technology in 3D Animation Production and Design. Writer's World, 2025, 1: 141-143.

[5] Zhang Sixuan. Analysis of Interaction Patterns in Virtual Idols in the Posthuman Era: A Case Study of "Star Eye". Journal of Journalism Studies., 2024, 15 (24): 7-12.

[6] Industry research database. Observation on the important trends of the international cultural and creative industries. 2023, https://research.taicca.tw/article/25bc4e9a-ed2b-422c-aae3-4b02644736f8.

[7] The ACGR Research Department. LoveLive! The economy is as large as that at 1 trillion yen. 2025, https://hkacger.com/archives/11314.

[8] Yan Jiajing, Jin Weiliang. The virtual idol China Dream of the three-dimensional team Hennian behind the two-dimensional singer Luo Tianyi. East China University of Science and Technology, 2015, (04): 58-63.

[9] Lian Naiyu, Xu Hengzhe, Cao Shifeng. The Rise of "Alternative" Idols: Exploring the Open Innovation Path of Emerging Cultural Enterprises Through Tianyi He Nian. Journal of Guangdong University of Petrochemical Technology, 2025, 35 (02): 81-84.

[10] Xu Zexiang, Zheng Xiaoxiao, Chen Ye. Challenges and New Paths for Enterprise Data Asset Evaluation in the Digital Economy Era. China Appraisal Journal, 2025, (05): 32-38.