

Analysis of Overcoming the Uncanny Valley Theory about Virtual Influencers in Digital Environments

Jiaqi Wang

*University of Amsterdam, Amsterdam, Netherland
wangjq199509@163.com*

Abstract. Virtual influencers have been widely adopted in virtual environments, and the metaverse has emerged as a prominent trend in the marketing field. To enhance consumers' purchase intention, marketers and scholars are committed to exploring the application of virtual influencers. Currently, humanized virtual influencers are so humanized that they are indistinguishable from real people. However, due to the uncanny valley effect, high-level humanized virtual influencers fail to gain complete acceptance. Previous solutions have focused on optimizing the authentic appearance of virtual influencers. But virtual influencers cannot fully replace human influencers, as their high degree of humanization tends to evoke discomfort among audiences. Current studies have indicated that the integration of social cues can alleviate individuals' uncomfortable feelings toward non-living digital entities. Therefore, this paper proposes the utilization of both synthetic and human voices to improve the performance of virtual influencers. Meanwhile, the future study could explore which combination (human-like vs cartoon-like virtual influencers and synthetic voices vs human voices) is the most suitable for optimizations.

Keywords: Virtual Influencers, Humanization, The Uncanny Valley Theory, Synthetic Voice

1. Introduction

In the realm of virtual marketing, the phrase "virtual influencers" is widely used. High-level humanized traits have recently been incorporated into virtual influencers to offer a distinctive interacting experience with actual people. The Chinese Spring Festive Gala Show in 2024 used a variety of digital technology to introduce Tang Dynasty poet Li Bai to actual people. Using virtual reality interactive technologies, this virtual human "Li Bai" stood realistically in the street and sang the well-known verse "The Yellow River comes from the sky." This innovative experience has impacted individuals' behaviors and cognitions about virtual environments. Compared with human influencers, virtual influencers who are characterized by lower costs, easier management, and lower risk are making significant contributions to marketing activities. Considering the efforts invested in influencer marketing and the risks associated with the reputational damage of human celebrities, virtual influencers can be employed to mitigate these risks. Virtual influencers are identified as two types: cartoon-like and human-like. Both types of virtual influencers applied in marketing campaigns lead to consumers showing positive attitudes towards brands, products, services, and organizations. However, the uncanny valley theory can explain the unexpected consequences: high-

level humanized virtual influencers evoke uncomfortable feelings among individuals because of their lower expectations of virtual entities. Nevertheless, integrating additional social cues offers solutions for this problem. Voice is a crucial element for optimizing virtual entities in digital environments. Various voice forms, such as synthetic voices, have been improved by advanced digital technologies. Therefore, this essay aims to provide essential suggestions for improving the performance of virtual influencers by pairing different types of voices. Meanwhile, it may guide marketers and scholars to explore which types of voices are suitable for application in virtual influencers.

2. Literature review

2.1. Virtual influencer

Following the development of technologies, which is creating various needs and categories of products or services, the success of influencer marketing is offering more opportunities for organizations to manage their brands, products, services, customer relationships, and more. Researchers defined influencer marketing as popular influencers using social media to promote brands, products, or services [1]. Moreover, influencer marketing has led to overperformed business performances, with expectations reaching over \$8 billion by 2022 [1]. However, managing the risk from human influencers is a crucial mission for organizations [2]. Utilizing the development of digital technologies, which enhances different experiences for consumers, virtual influencers are not only easily managed to reduce the risk of reputation damage but also create more opportunities for consumers to have more interactions. Virtual influencers are defined as more human-like avatars generated by computers [3]. The development history of virtual influencers dates back to 3D technologies used to design online avatars for serving people [4]. Meanwhile, digital technologies are leading to a high level of humanized virtual influencers. Researchers have also indicated that the more humanized virtual influencers blur the concept between virtual and reality [3]. However, there is no explicit definition of the different types of virtual influencers. To distinguish several types of virtual influencers, avatars have been introduced. Avatars are defined as people's self-expressions generated by computer technologies in virtual environments [5]. The virtual influencers have been regarded as a subgenre of virtual avatars [6]. Researchers have identified three types of avatars: first, realistic avatars, which are described as users' self-expression; second, abstract avatars, which are depicted as cartoon-based or fictitious images; third, naturalistic avatars, which could be defined as more human-like images [5]. Due to these three types of virtual avatars, there are two types of virtual influencers that have been mentioned: cartoon-like and human-like virtual influencers.

Both types of virtual influencers have been studied for several applications in the marketing field. Virtual influencers have been defined as computer-based avatars with more human-like characteristics, similar to human influencers, who operate on social media to introduce product knowledge that influences consumer behavior [6]. The most important applications of cartoon-like virtual influencers involve using their cartoon characters to evoke emotional resonance in audiences [7]. Therefore, this emotional resonance could lead to bonds between consumers and organizations. Moreover, cartoon-like virtual influencers have been widely used in marketing campaigns. For example, researchers indicated that Pikachu has been used as a cultural ambassador in Japan. Additionally, another example in China is The Honor of Kings, published by Tencent, whose game characters have been widely used in various products or goods [8]. Meanwhile, the application of cartoon-based virtual influencers has been regarded as a gamification strategy applied in several industries, providing more opportunities for business activities [9]. On the other hand, human-like

virtual influencers have been used in different marketing strategies. They have gradually exhibited more humanized characteristics to serve as human influencers, establishing a stronger connection between consumers and organizations [10]. Human-like virtual influencers are classified into two types based on their practicability: celebrity-based and ordinary-based design. Human-like virtual influencers have been identified as representing human-like images with low-level details and high-level characteristics, which are designed based on human images [11]. For example, in China, Liu Yexi is a famous virtual influencer on a short video platform [12]. Moreover, Liu Yexi serves as a classical case; since October 31, 2021, when the first video was launched, she has already gained millions of followers [8]. Another example in China is Yi Yang Qian Xi, a celebrity who collaborated with Tian Mao to create his virtual image called Qian Miao. Qian Miao made a significant contribution upon its launch, garnering over 1 million retweets and 8 billion views on Weibo.

Both cartoon-like virtual influencers and human-like virtual influencers have become a popular trend for marketers and scholars to explore how to use these virtual influencers in marketing campaigns. Current studies have found that the design and appearance of virtual influencers have a great impact on consumer behaviors. Researchers indicated that cartoon-based virtual influencers are designed based on original cartoon characters, which have a significant impact on consumer behaviors by capturing attention and fostering positive attitudes towards the brand [13]. Moreover, researchers have found that audiences show more positive responses to cartoon-based advertisements than to human spokespersons, leading to increased purchase intentions [14]. Besides, human-like virtual influencers also have a great impact on consumer behaviors. Researchers have found that celebrity-based virtual influencers could have a similar impact as celebrity influencers [15]. Additionally, researchers indicated that virtual influencers, whether cartoon-based or human-like, with more humanized characteristics, could elicit positive responses from audiences, stemming from authenticity [16]. Therefore, based on previous studies about virtual influencers, researchers have already found that humanization is the most important factor in determining their efficiency.

2.2. Humanization and the uncanny valley theory

In a virtual environment, virtual images are increasingly humanized, leading to stronger interactions between consumers and brands or organizations. Researchers have indicated that humanized virtual influencers with a high level of human-like characteristics have been found to elicit stronger interactive responses, resulting in positive brand perceptions and higher purchase intentions [17]. Cartoon-like and human-like virtual influencers utilize different forms to exhibit their human-like qualities. Cartoon-like virtual influencers employ more animated images and emotional factors, which lead to positive responses from the audience, persuading consumers to change their behaviors [18]. Taking it a step further, combining the application of animated images with specific historical and cultural backgrounds creates positive attitudes towards animated images [19]. Therefore, cartoon-like virtual influencers are not only associated with animated characteristics but also incorporate people's emotional connections. However, human-like virtual influencers prefer to showcase their original images with more human-like characteristics or personalities to demonstrate their professional knowledge about products, services, and brands. Similar to human or celebrity influencers, human-like virtual influencers could utilize three main elements: credibility, attractiveness, and influence. Researchers have indicated that these three elements could be employed in designing more human-like virtual influencers to replace human influencers [20].

Humanization could be defined as the concept of imbuing non-living things with human characteristics [21]. Researchers have already indicated that humanized images, based on their more

human-like design, enhance consumers' positive attitudes towards the brand [22]. Moreover, humanized virtual influencers have been proven to have a great impact on increasing consumers' experiences [23]. Meanwhile, other researchers have indicated a positive relationship between virtual images with more human-like characteristics and customer satisfaction [24]. Therefore, previous studies have indicated that more humanized virtual influencers made a significant contribution to changing consumer behaviors. However, there is an important issue between humanized virtual influencers and consumers' purchase intentions. Although technological innovations have endowed virtual influencers with more human-like characteristics, potentially increasing the risk of consumer adoption, these risks arise from people's perception regarding the development of humanized virtual influencers and the uncanny valley theory effect. This effect causes people to show negative responses to events that exceed their expectations [25]. The uncanny valley theory effect shows that people tend to feel uncomfortable when they encounter those who are more human-like [26]. Researchers have also indicated that these risks from the uncanny valley theory effect could be solved by associating more social cues to reduce people's uncomfortable feelings about non-living entities [25].

Therefore, in order to increase the efficiency of virtual influencers to overcome the uncomfortable feelings about humanized non-living entities, people need to think about combining more social cues with virtual influencers, such as human voices. Utilizing human voice to combine with virtual influencers would like to increase its capabilities for interacting with consumers. Researchers have shown that incorporating voice into virtual entities can enhance people's acceptance of non-living entities more than anticipated, thus mitigating the uncanny valley effect [27]. However, different types of voices are created by various digital technologies. Compared with typical human-recorded voices, synthetic text-to-speech voices are becoming the first choice for customizing.

2.3. Human voice vs synthetic voice

Utilizing voice to attract consumers' attention is a common practice in auditory marketing. As a subset of sensory marketing, which is defined as a marketing strategy that stimulates consumers' senses to change their behaviors [28] and plays a significant role in attracting and persuading consumers to change their perceptions [29]. In auditory marketing, voice is regarded as a crucial element for constructing sound experiences [30]. More importantly, researchers have indicated that using voice is more effective in influencing consumer behavior by strengthening the relationship between brands and individuals [31]. Therefore, voice, as one of the social cues, should be considered to enhance the social presence of virtual entities and thereby mitigate the negative effects of high-level humanized virtual influencers.

Voices can be embedded with humanized virtual influencers to deliver information and stimulate interactions with individuals. Researchers have noted that voices are regarded as an "auditory face" that introduces product knowledge and enables differentiation from competitors by offering unique listening experiences. Furthermore, relevant studies proved that voices applied in virtual environments can enhance the credibility of virtual entities [32] and increase individuals' favorability about virtual entities [33]. Typically, recorded human voices are employed for various media to deliver information. However, the advanced digital technologies have accelerated the different types of voices. Notably, the use of synthetic voices in marketing communication strategies has become an innovative method to increase interactive experiences. Synthetic voices are defined as computer-generated speech created by text-to-speech technologies [34]. The development of synthetic voices has a long history, dating back to the 1930s when they could only generate simple

sentences [34]. Currently, synthetic voices based on AI technologies have become so humanized that they are indistinguishable from real human voices [35]. Researchers have indicated that both synthetic voices and human voices positively impact the authenticity of virtual entities by embedding humanized social cues [36]. Meanwhile, researchers argued that humanized virtual entities embedded with speaking ability could cause positive social responses. Consequently, virtual influencers integrated with different types of humanized voices can improve consumers' attitudes toward products, services, or brands. However, how to design the most appropriate combination of virtual influencer types and voice types remains an important research question.

3. Conclusion

This paper summarizes human-like and cartoon-like virtual influencers, both are significant virtual entities employed in marketing campaigns. Virtual influencers are commonly used in marketing communication strategies, as they provide unique interactive experiences via social media. Additionally, the advantages of applying virtual influencers are lower cost and easier management, which motivates marketers to explore their applications. Previous studies can guide the exploration of virtual influencers' applications. Obviously, virtual influencers play a significant role in influencing consumers' behaviors of Generation Z. However, the uncanny valley theory provides a rational explanation for the negative feelings that come from high-level humanized virtual influencers. In most cases, organizations or designers create virtual influencers with approximately attractive appearances. Nevertheless, negative feelings from non-living entities have not been solved yet, which is an important research question.

The use of social cues is an effective method to improve the authenticity of virtual influencers. Previous studies have provided essential clues to explore how the advanced social presence of virtual entities can improve consumers' behaviors and perceptions. Meanwhile, the advancement of digital technologies is offering more opportunities to optimize customized virtual influencers. Both synthetic and human voices are useful for enhancing the performance of virtual influencers. However, the issues of how to select the optimal combination of different voice types and virtual influencer types will be addressed in this paper. Specifically, this paper aims to propose a feasible method for increasing the performance of virtual influencers, which suggests that virtual influencers can be embedded with humanized voices. Furthermore, to explore ways for overcoming the uncanny valley effect, this essay suggests pairing two types of virtual influencers (cartoon-like and human-like) with two types of voices (human and synthetic). Future research can build on this recommendation to explore the most suitable combination.

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