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Deepfake ads and Virtual Personas: The Intersection of Personalization and Manipulation in Modern Advertising

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Abstract

In recent years, deepfake technology and virtual personas have rapidly evolved, becoming influential tools in modern advertising. This paper explores the intersection of these technologies, examining their impact on the advertising industry, consumer behavior, and ethical considerations. Deepfake technology, which uses AI to create highly realistic but synthetic audio, video, or images, has revolutionized content creation by allowing the production of personalized and dynamic advertisements at scale. The integration of deepfakes and virtual personas in advertising presents numerous opportunities, such as enhancing brand storytelling, targeting specific demographics with tailored content, and reducing production costs. However, this intersection also raises significant ethical & regulatory concerns. This paper aims to investigate how the intersection of deepfake technology and virtual personas within the realm of modern advertising affects user engagement. The primary problem this research seeks to address is the lack of comprehensive knowledge about how deepfake technology and virtual personas influence user engagement in advertising. This study employed an experimental approach, utilizing a structured questionnaire based on a 5-point Likert scale to explore the impact of integrating deepfake technology and virtual personas into contemporary advertising on user engagement. The research concluded several findings, the most significant of which is that there are statistically significant differences in the levels of engagement and connection of the sample group towards deepfake advertisements compared to traditional advertisements.

Keywords

Deepfake ads, adv Manipulation, Modern Advertising

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Introduction:

The emergence of deepfake technology in advertising has positioned it as a pioneering tool in the industry, enabling deeper and more personalized engagement with audiences. By harnessing artificial intelligence to create hyper-realistic virtual personas and manipulate digital content, advertisers can craft unique and compelling campaigns that stand out in a saturated digital landscape. Deepfake technology facilitates the ability to identify individual preferences and design advertisements tailored accordingly, making them more relevant and appealing to each user. For instance, a deepfake-generated persona can address viewers by name or interact with them in highly personalized ways, enhancing user engagement and emotional connection. Moreover, it offers high realism and creative flexibility at an efficient cost. Advertisers can produce realistic videos without the need for extensive resources, such as hiring actors, organizing shoots, or scouting locations. This democratizes access to high-quality content, allowing smaller businesses to compete effectively without significant budgets.

Deepfake technology also supports cross-cultural adaptability. It enables seamless localization of a single advertisement for diverse languages, accents, and cultural contexts, ensuring better resonance with global audiences. A virtual spokesperson, for example, can deliver the same message tailored to the preferences of various regions, fostering inclusivity and relevance. Additionally, deepfakes open the door to innovative storytelling. Virtual personas can represent brand values or fictional characters, offering immersive narratives that captivate audiences. These personas can even interact with users in real-time, providing an unprecedented level of interactivity and engagement in advertising experiences. However, the ethical implications of deepfake advertising must not be overlooked. Concerns about transparency and potential audience skepticism can pose challenges to the adoption of this technology. Responsible use of deepfake advertising, therefore, becomes critical to maintaining consumer trust.

This study delves into the significant intersection of personalization and manipulation in modern advertising, shedding light on the dual nature of

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deepfake technology. It presents insights into how this transformative tool can redefine the way brands connect with users in the digital age while emphasizing the importance of ethical considerations to unlock its full potential.

The Problem of Research:

The primary problem this research seeks to address is the lack of comprehensive knowledge about how deepfake technology and virtual personas influence user engagement in advertising.

Objective of Research:

This paper aims to investigate how the intersection of deepfake technology and virtual personas within the realm of modern advertising affects user engagement.

Hypotheses of Research:

- **H1:** Advertisements utilizing deepfake technology will generate higher user engagement compared to traditional advertisements.
- **H2:** Virtual personas created using deepfake technology will be perceived as more relatable and engaging by users than real human personas in advertisements.
- **H3:** Advertisements featuring deepfake-generated virtual personas will evoke stronger emotional responses from users compared to those using traditional advertising methods.
- **H4:** Ethical concerns and awareness of deepfake technology will moderate the relationship between the use of deepfakes in advertising and user engagement, with higher awareness leading to lower engagement.
- **H5:** The intersection of personalization and manipulation in deepfake advertising achieves a greater impact on user engagement and connection.

Limits of Research:

The scope of this research is limited to studying the impact of using deepfake technologies in advertisements on the Facebook platform, as it is the most widely used among Egyptian users according to recent statistics. The research sample was carefully selected to represent the target group, and the actual measurement period for the study extends from June 20, 2023, to May 20, 2024, with a commitment to ethical guidelines to ensure the protection of users' privacy and prevent any potential harm.

The Methodology of Research:

The study adopted an experimental methodology, employing a survey questionnaire structured into two main sections. Section 1 focused on demographic characteristics and consisted of five questions designed to collect respondents' sociodemographic information. Section 2 comprised a set of 40 statements measured on a 5-point Likert scale, adapted from Chesney and Citron (2019), Kaplan and Haenlein (2020), Wardle and Derakhshan (2017), and Cook et al. (2017). This section aimed to examine the interplay between deepfake technology and virtual personas within the context of modern advertising and its influence on user engagement.

Research Importance:

This research will provide valuable insights into how deepfake technology and virtual personas affect user engagement. By examining these technologies, the study will enhance our understanding of consumer behavior in response to emerging digital advertising techniques. This knowledge is essential for marketers aiming to optimize their approaches in a rapidly evolving digital landscape**.**

Additionally, this paper will offer valuable insights into future trends in advertising. By identifying potential future trends and developments, the research will help businesses and marketers prepare for the evolving advertising landscape. Understanding the trajectory of deepfake technology and virtual personas will allow for strategic planning and adaptation**.**

Tools of Research:

- Three deepfake advertising campaigns.
- Facebook as the delivery platform.
- Statistical Methods for Data Analysis: Data were analyzed using the Statistical Package for the Social Sciences (SPSS, Version 25). The following statistical techniques were employed:
- Pearson Correlation Coefficient: To assess the internal consistency and construct validity of the research instrument.
- Cronbach's Alpha Coefficient: To evaluate the reliability and internal stability of the questionnaire.
- Mean Score Calculation: To determine the degree of agreement with each statement in the questionnaire using a 5-point Likert scale.

Theoretical background

Understanding Deepfake Technology

Deepfake technology utilizes artificial intelligence to produce highly realistic yet fabricated media content—including videos, audio, and images—that closely resemble real people. The name "deepfake" originates from "deep learning," a branch of machine learning that employs neural networks to simulate human cognitive processes. These

networks analyze vast datasets to generate media that can be nearly indistinguishable from authentic recordings. The technology initially gained notoriety for its misuse in creating non-consensual and misleading content, but its potential in legitimate applications, particularly in advertising, has since been recognized (Robert Chesney and Danielle Citron 2019). Deepfakes enable brands to create highly customized and dynamic advertisements. For instance, using deepfake technology, an advertisement can feature a famous actor endorsing a product, even if that actor is unavailable for filming. Furthermore, the actor's message can be tailored in real-time to appeal to different demographics or regions, making the content more relevant and engaging for diverse audiences**.** (linkedin.com/pulse 2024; Robert and Danielle 2019)

This study defines deepfakes as hyper-realistic visual representations—often in video form—that imitate real individuals. This aligns with existing scholarly definitions. For instance, Gamage et al. (2022) describe deepfakes as synthetic media created through advanced deep learning and artificial intelligence techniques. Similarly, Kaate et al. (2023) emphasize the role of AI technologies in generating such highly convincing content.

Deepfakes offer the potential to create more engaging, immersive, and lifelike user representations—such as virtual personas—that stakeholders and designers can interact with to gain deeper insights into users' needs, preferences, goals, and everyday experiences. By leveraging this technology, personas can become more vivid and empathetic, enhancing their realism and emotional resonance. This, in turn, may improve the effectiveness of communicating user-related insights to designers, making user profiles more relatable and informative (van Esch & Stewart Black, 2021; Whittaker et al., 2021).

Detection Techniques for Deepfake Content

Detecting deepfake content has become increasingly difficult due to the rapid progress in generative AI and the enhanced realism of synthetic media (Ali et al., 2021). In response, researchers have proposed various detection methods. Forensic analysis, for instance, focuses on identifying visual or auditory inconsistencies—such as irregular lighting, unnatural facial expressions, or anomalies in metadata—that may suggest tampering. Digital forensic tools are often used to uncover compression artifacts and hidden manipulation traces. Additionally, AI-based techniques—particularly those involving deep neural networks—play a central role in distinguishing authentic content from fabricated media by learning to recognize subtle patterns in facial features, motion, or audio spectrograms (Masood et al., 2023). Another area of focus is the analysis of facial and bodily movements, where current deepfake systems often fall short. Minor deviations in blinking, eye tracking, or muscle movement can serve as indicators of inauthenticity. Techniques such as facial action coding systems help in identifying these abnormalities, offering deeper insight into the reliability of visual content (Borji, 2023). These approaches, while still evolving, form the foundation for ongoing efforts to safeguard digital media integrity.

Multi-modal detection strategies have emerged as a promising direction in the fight against deepfakes, leveraging both visual and auditory cues to improve detection accuracy. By integrating facial recognition with voice analysis, these approaches offer a more holistic evaluation of a video's authenticity, allowing systems to cross-validate data across different sensory channels. This fusion of information across modalities has been shown to significantly enhance the robustness and reliability of detection mechanisms (Malik et al., 2022). In parallel, dataset and model-level analysis plays a crucial role in understanding and exposing the limitations of deepfake technologies. Researchers often investigate the composition and quality of the datasets used to train generative models, recognizing that these datasets may lack the diversity needed to fully replicate real-world variability. Furthermore, analyzing and reverse-engineering the generative models themselves can reveal distinctive artifacts or algorithmic patterns that serve as indicators of manipulated content (Giudice et al., 2021). Together, these approaches contribute to building more resilient systems for identifying synthetic media.

Technological Foundation of Deepfakes

Deepfake technology is built upon sophisticated artificial intelligence methods, particularly deep neural networks (DNNs) and generative adversarial networks (GANs). GANs operate through a dual-network structure: one network, known as the generator, produces synthetic content, while the other, the discriminator, assesses whether the generated data appears authentic. Through this iterative competition, the system gradually

enhances the realism of the output, resulting in highly persuasive fake media (Goodfellow et al., 2014).

Applications in Advertising:

Deepfake technology offers a range of applications in advertising, enhancing both the quality and effectiveness of marketing campaigns (Fig 1). (Chesney & Citron 2019)

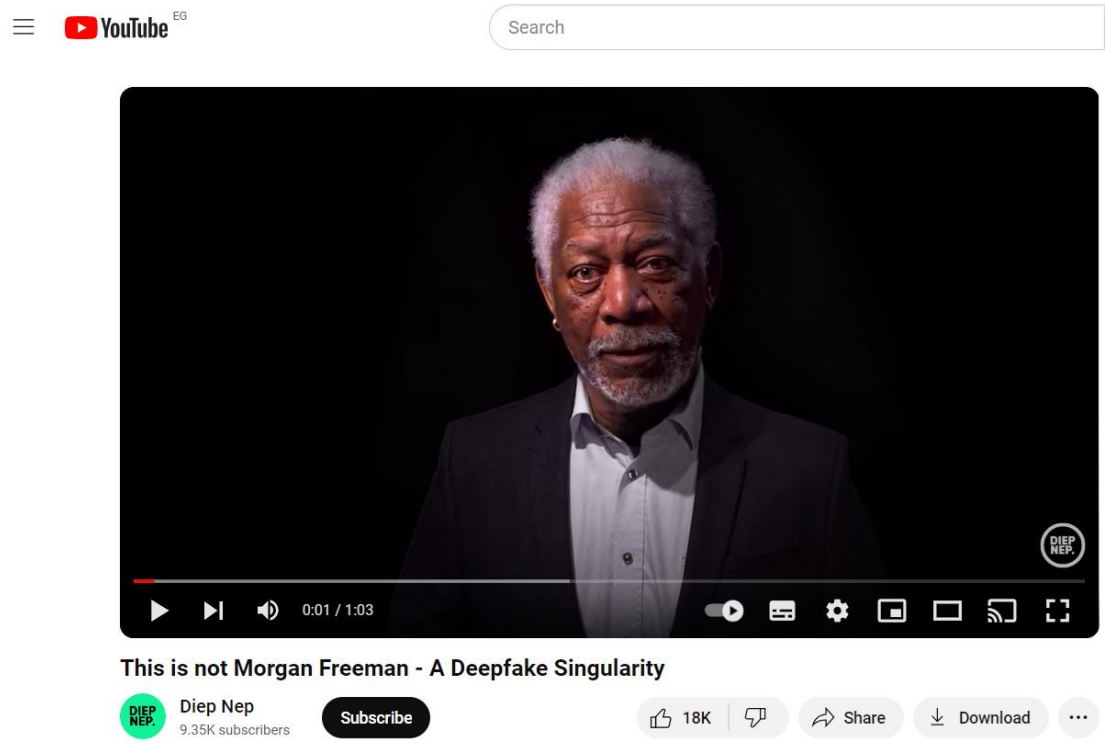


Figure (1) This is not Morgan Freeman - A Deepfake Singularity- 1,774,456 views 7 Jul 2021 #deepfake #morganfreeman #ai

Enhanced Celebrity Endorsements

One of the most prominent applications of deepfake technology in advertising is the creation of highly realistic celebrity endorsements. Brands can use deepfakes to feature celebrities in advertisements without requiring their physical presence. This approach allows for more flexible and cost-effective marketing campaigns (Fig 2) (Chesney & Citron, 2019).

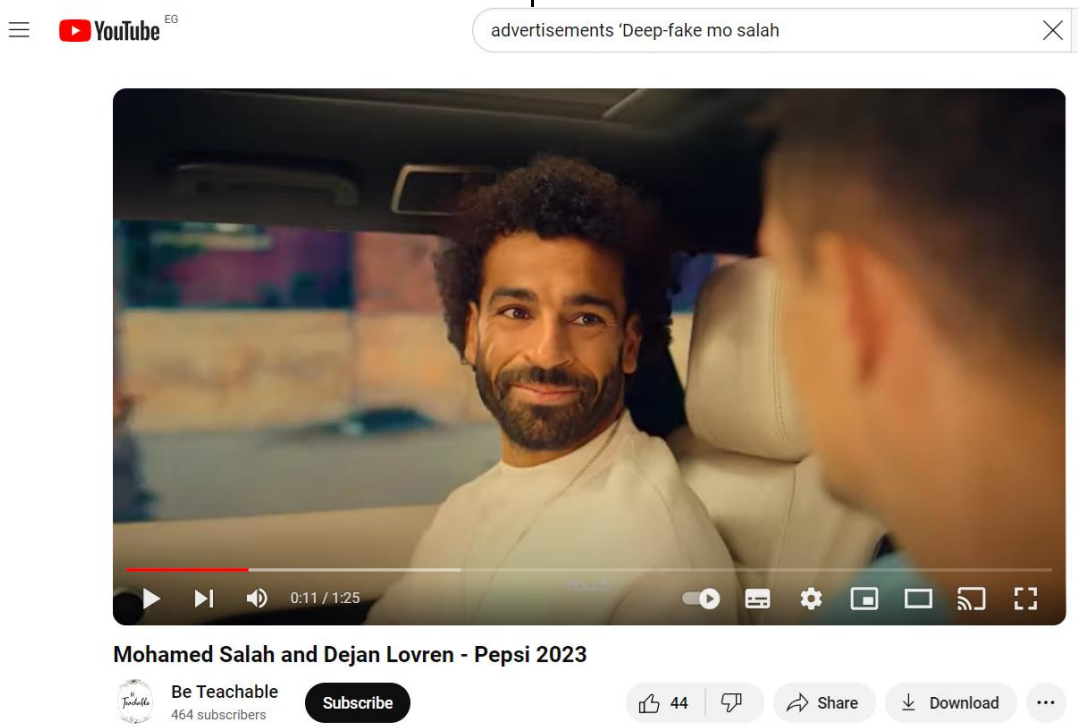


Figure (2) Mohamed Salah's new ad - Pepsi 2023- 4,182 views 18 Sep 2023

Personalized Marketing

Deepfakes enable highly personalized advertising experiences. By generating customized messages featuring familiar faces or simulated interactions, brands can create content that resonates more deeply with individual consumers. This personalization can increase engagement and conversion rates.
https://blog.emb.global/deepfakes-responsible-use/

Virtual Product Demonstrations

Deepfake technology allows for the creation of virtual product demonstrations that appear highly realistic. Advertisers can showcase how products work or how they might fit into a consumer's life using simulated scenarios. This application can help potential customers visualize product benefits more effectively.
https://www.respeecher.com/blog/impact-deepfake-technology-digital-marketing-advertising

Interactive Advertisements

Interactive advertisements created with deepfake technology can offer dynamic and engaging experiences. For example, (Fig 3,4) ads can feature interactive virtual personalities that respond to consumer interactions in real-time. This interactivity can enhance user engagement and brand recall (Lugmayr et al., 2021).

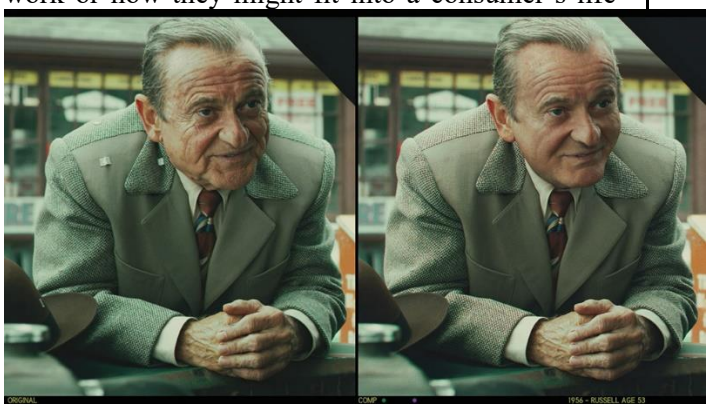


Figure (3) Netflix used deepfake technology in a campaign where it allowed viewers to interact with the characters from The Irishman (played by Robert De Niro, Al Pacino, and Joe Pesci).

Figure (4) A deepfake artist's attempt to make Robert De Niro look younger in 'The Irishman' is being hailed as superior to Netflix's CGI

Immersive and Interactive Content

The use of DT enables the growth of immersive and interactive advertising experiences. Brands can create virtual spokespersons or interactive video ads where the content adapts to user interactions in real-time. This level of interactivity can lead to more engaging and memorable consumer experiences, driving higher levels of participation and interaction (Campbell et al., 2021).

Figure (5) deepfake Neon" project

Samsung's "Neon" project introduces CGI-enhanced virtual personas Fig (5) designed to emulate realistic interactions, similar to live product demonstrations. While the scenarios showcased at their CES booth and in promotional materials are fictional and simulated for illustrative purposes, each Neon avatar is "computationally generated." These virtual beings can engage in conversations, exhibiting "emotions and intelligence," as described by the company. Although their appearances are

inspired by real humans, their "expressions, dialogues, and emotions" are uniquely generated. These avatars, referred to as "NEONs," are customizable for various tasks and capable of responding to user queries.

Enhanced Consumer Engagement

Deepfake technology enhances consumer engagement by enabling realistic and emotionally resonant advertisements. Brands can use deepfakes to simulate real-life scenarios or create emotional connections with audiences through personalized messages. This heightened engagement can lead to increased brand loyalty and improved campaign effectiveness (Gligor et al., 2022).

The Rise of Virtual Personas

The digital era has revolutionized interaction, communication, and the concept of identity. Rapid advancements in artificial intelligence (AI) have given birth to a transformative trend: virtual personas. These AI-powered digital avatars, once confined to the realm of science fiction, are now a concrete and impactful presence across various facets of society. Whether in entertainment, customer service, marketing, or social media, virtual personas are redefining the way we engage with technology and shaping the future of work and everyday life. (Ilkka et. al, 2023)

Personas are fictional representations of real end-user groups, widely utilized in design, software development, and marketing to foster a closer connection between creators and the intended audience (Anvari and Richards, 2018, 2016; Anvari et.al, 2017) Personas serve as surrogates for real users, helping designers empathize with and understand the needs and behaviors of the people they represent. (Pruitt & Grudin 2003)

The term "persona" is used in two contexts. First, it refers to a user persona—a representation of a user group created to support tasks such as design, aiming to embody the traits of that group and evoke empathy in users, like designers. Second, it refers to the self-image, a concept rooted in Carl Jung's analytical psychology. As noted by Weisman and Peña (2021), deepfakes have the potential to enhance the realism of artificial agents, fostering simulated empathy and emotional connections. Similarly, van Esch and Stewart Black (2021) highlight that deepfake videos can effectively communicate messages and influence audiences. Leveraging this capability, deepfake personas could provide valuable tools for supporting designers, offering more dynamic and impactful representations of user groups. (Campbell et. al, 2022; Hayes et.al, 2021)

The concept of personas, first introduced by Alan Cooper in 1999, emerged as a way to represent users through fictional archetypes during the design of software-driven products (Cooper & Saffo, 1999). These user personas serve as valuable tools that enable designers and developers to better understand and empathize with target audiences by engaging with realistic, though imagined, user profiles (M. Probster et al., 2018; Nielsen et al., 2017). Rather than constructing a full depiction of a person, persona development typically emphasizes key attributes—such as user behaviors, attitudes, goals, and skill sets—that are most relevant to the product's context (Nielsen et al., 2017).

However, since personas can unintentionally reinforce stereotypes (Marsden N. and M. Haag, 2016), it is important to ensure that the diversity of users is properly represented. To avoid stereotyping and account for overlooked aspects, Marsden and Proebster (2019) recommend considering the multiple identities of individuals. This approach helps create a more inclusive representation, ensuring that underrepresented users are considered (Marsden et al., 2019). Personas are particularly useful in bringing attention to the needs of overlooked or marginalized user groups, guiding designers and developers to approach these perspectives more effectively (Shekhar and N. Marsden, 2018).

Simultaneously, the rise of deepfake technology has paved the way for virtual personas—AI-driven avatars or characters that interact with consumers on behalf of brands. Unlike traditional CGI or animated characters, virtual personas are often designed to resemble real people, complete with backstories, personalities, and social media profiles. These personas can be entirely synthetic, like Lil Miquela, (Fig 6) a digital influencer with millions of Instagram followers, or they may serve as digital replicas of actual individuals. (Pruitt & Grudin 2003) Lil Miquela: One of the most famous virtual influencers, Lil Miquela, was created by the startup

Brud. She has collaborated with brands like Calvin Klein, Prada, and Samsung. With millions of followers on Instagram, Lil Miquela blurs the line between human and AI, creating a unique platform for brand storytelling and engagement.https://www.virtualhumans.org/human/miquela-sousa

Figure (6) Lil Miquela: The Virtual Influencer, April 23, 2016
Originally From Los Angeles, California, USA

The advancement of sophisticated AI technologies, such as machine learning, natural language processing (NLP), and computer vision, has played a pivotal role in the evolution of virtual personas. These technologies have empowered virtual personas to engage in more complex conversations, express emotions, and even generate content autonomously. As a result, virtual personas have moved beyond scripted responses and are now capable of dynamic, personalized interactions, offering a more immersive and authentic user experience.

The rise of virtual personas in advertising can be attributed to their capacity to effectively represent a brand's identity while offering personalized interactions with consumers. These digital figures can engage with audiences around the clock across multiple platforms, ensuring consistent and on-brand experiences. This ability to provide continuous, controlled engagement makes virtual personas particularly advantageous in influencer marketing, where they can promote products with greater predictability and precision than human influencers. A prominent example of virtual persona integration in digital media is Shudu, a computer-generated supermodel developed by photographer Cameron-James Wilson. (Fig 7), Shudu has been featured in advertising campaigns for luxury brands such as Balmain and Fenty Beauty, illustrating the growing influence of virtual influencers in reshaping fashion marketing. These digital models offer brands a highly flexible and easily controlled alternative to traditional human ambassadors. Social media, particularly Instagram, has been instrumental in amplifying the popularity of virtual personas. Since her introduction in April, Shudu has gained a significant following, reaching 61,800 followers on the platform. Initially, her online identity was deliberately enigmatic, with her bio simply asking, “Who is she?”. Following public interest, Wilson disclosed her digital origins, after which her profile was updated to reflect her status as the “World’s First Digital Supermodel.”What brands should know before hiring a digital celebrity | Vogue Business

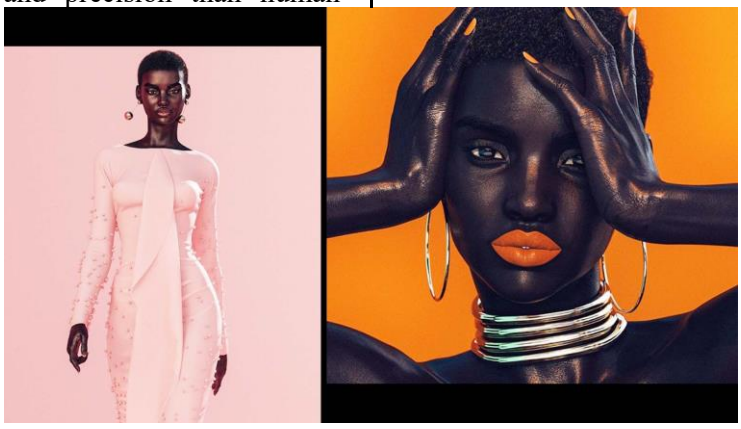


Figure (7) Shudu virtual charcter for high-end brands like Balmain and Fenty Beauty,
https://www.gqindia.com/content/shudu-model-worlds-first-digital-supermodel-on-instagram

KFC took an innovative approach by reimagining its iconic Colonel Sanders as a youthful, fitness-focused virtual influencer. This CGI-generated version of the Colonel has appeared on Instagram, promoting the brand in a modern, relatable manner aimed at appealing to younger audiences. Despite not being a real person, this virtual influencer has cultivated a following due to his attractive persona and engaging content on Instagram.

Figure (8) KFC's Virtual Colonel
https://digitalagencynetwork.com/meet-kfc-new-computer-generated-virtual-influencer-colonel/

Modern ads and virtual persona

Personas play a significant role in enhancing brand perception by offering detailed, relatable representations that help foster emotional connections between consumers and brands. Although virtual personas have existed for some time, their relevance has notably increased over the past decade. Several factors contribute to this rise: the widespread availability of high-speed internet, the growing demand for convenience among time-constrained consumers, and companies' strategic investments in developing personas that communicate brand values effectively. Additionally, creating and maintaining virtual personas is often more cost-effective than traditional advertising campaigns. These personas can also be modified regularly to align with changing consumer preferences, further increasing their utility. Perhaps most importantly, consumer trust and confidence in virtual personas have continued to grow, reinforcing their influence in modern branding strategies (Sunita & Sridharan, 2023; Kumar & Aravamudhan, 2023).

The concept of an intelligent persona (IP) encompasses two key aspects: (a) the intelligent features of an interactive persona system, and (b) personas created through artificial intelligence (AI) technology. The latter is sometimes referred to as AI personas by certain authors, while others describe them as algorithmically-generated or data-driven personas. Persona analytics, on the other hand, refers to the use of analytics in understanding customers or users through systems that integrate personas or to understanding how stakeholders interact with persona profiles and systems (Holzinger et. al, 2022: Salminen et. al, 2022).

Digital influencers represent one of the more unconventional strategies companies are employing to ensure brand safety. These artificially (Fig 8) created personas hold the same influence as human social media stars, but without the unpredictability that comes with managing real individuals though it is important to note that virtual influencer accounts are still operated by humans.

The IP concept builds upon existing research in data-driven personas, interactive persona systems, and intelligent systems that utilize advanced human-computer interaction (HCI) techniques. These systems play a crucial role in supporting marketing functions by employing personas. More broadly, the concept of IP can be leveraged to envision an intelligent, end-to-end advertising system that aids human marketers in decision-making by integrating data-driven personas throughout the various stages of the modern online advertising process. This approach allows IP to support the diverse tasks of online advertisers, enhancing their ability to create more personalized and effective marketing strategies (Salminen et. al, 2022).

Deepfake ads and Privacy Concerns:

Deepfake technology raises significant ethical and legal concerns, particularly regarding privacy violations when unauthorized likenesses of individuals are created. Advertisers must ensure compliance with privacy laws and uphold individuals' rights (Whittaker et al., 2021). Moreover, the risk of misuse in advertising, such as crafting deceptive or misleading content that exploits consumer trust, highlights the need for robust ethical guidelines and regulations (Meskys, 2020).

At the same time, for deepfakes to deliver their potential benefits, it is essential that users have a positive experience with them. Negative reactions, such as discomfort or unease—often associated with the uncanny valley effect—could deter adoption and drive users toward alternative interaction methods. Thus, user perception is a critical factor in the successful integration of

deepfakes into Advertising practical applications (Masahiro 2012).

Understanding user perceptions of deepfakes is crucial, as these perceptions significantly impact the adoption of deepfakes in various applications, such as virtual reality environments, virtual assistants, and educational tools (Mike et al., 2021). For deepfakes to succeed in these domains, they must provide a positive user experience. If users perceive deepfakes as unreliable or confusing, it could lead to a poor UX and reduced acceptance of the technology.

Insights into user perceptions can help designers develop more effective, user-friendly systems that enhance overall UX (Dilrukshi et al., 2021). Perceptions also influence trust in the technology. For instance, individuals aware that a video is a deepfake may become more skeptical of its content, whereas those unable to distinguish between authentic and fake videos could inadvertently trust and spread misinformation (Jeffrey et al., 2021).

Although deepfakes are often associated with concerns about misuse due to their ability to manipulate images, videos, and audio (Liansheng et al., 2022; Mika, 2019), they also have significant potential for positive applications when used responsibly. In the gaming industry, for instance, deepfakes can enhance player experiences through personalized interactions and in-game aids, offering new possibilities for engagement and immersion (Mika, 2019).

Deepfake technology presents both advantages and challenges. One promising application lies in the creation of personas, as these are inherently fictional but realistic representations of people (Kwak, 2018). Personas are designed to convey details about the user groups they represent to designers, and using talking deepfake characters for this purpose could provide a more engaging and immersive medium for understanding the personas' needs. Moreover, personas have already been applied across various domains, ranging from commercial industries to non-profit sectors (Joni 2020; Joni 2021).

Synthetic Manipulation and personalization in modern advertising

Synthetic manipulation involves the use of artificial intelligence algorithms to autonomously edit or generate content. These algorithms allow for the creation of synthetic content, such as through the use of Generative Adversarial Networks (GANs), and enable smooth modifications using technologies like deepfakes. Deepfakes alter various attributes—such as a person's face, voice, skin tone, gender, accessory colors, or fashion designs—by swapping them between a source and a target through the training of a deep neural network called an autoencoder. Autoencoders work by following a three-step procedure. First, the encoder identifies and extracts roughly 300 features, such as abstract facial traits and emotional expressions, from a complex input, like a face. In the second step, the encoder compresses these extracted features into a smaller, more condensed format known as the latent space. Lastly, the decoder takes this compressed data and reconstructs it back into its original form. (Campbell 2021; loridi 2018; Kietzmann et. al, 2018).

While various forms of advertising manipulation enable a certain level of personalization, artificial manipulation—particularly through advanced technologies—allows for an unprecedented degree of individual customization. Leveraging data collected from sources such as social media platforms, retail tracking systems, and customer loyalty programs, marketers can design content in real time that aligns closely with each consumer's profile (Campbell et al., 2020; Kietzmann et al., 2020; Schelenz, Segal, & Gal, 2020). For example, advertisements could feature models who reflect the user's physical characteristics, such as race or height, dressed in styles that resemble previous purchases. Messaging within these ads can also be adapted to the viewer's familiarity with or loyalty to the brand. In more advanced applications, the technology might allow the product—such as clothing—to be superimposed directly onto the consumer's own image, rather than displayed on a model. As the complexity of these manipulations increases, so too does the potential for highly tailored and more persuasive advertising strategies (Campbell et al., 2020).

Customized advertising has been shown to positively influence consumer attitudes, boost purchase intentions, and generate other favorable behavioral outcomes (Aguirre et al., 2015; Mukherjee, Smith, & Turri, 2018; Tong, Luo, & Xu, 2020). However, the same level of personalization that enhances engagement can also heighten consumer awareness of being monitored, raising ethical and privacy-related concerns. The collection, storage, and use of personal data—often required for such targeting—can provoke discomfort among consumers (Plangger & Watson, 2015; Turow, McGuigan, & Maris, 2015). Reactions to this surveillance vary depending on individual perceptions of data monitoring practices (Plangger & Montecchi, 2020). When consumers perceive a lack of transparency, or are unaware that their data is being used in this manner, privacy concerns are more likely to emerge (Martin & Murphy, 2017; Okazaki et al., 2020), often accompanied by increased feelings of vulnerability (Aguirre et al., 2015; Martin, Borah, & Palmatier,

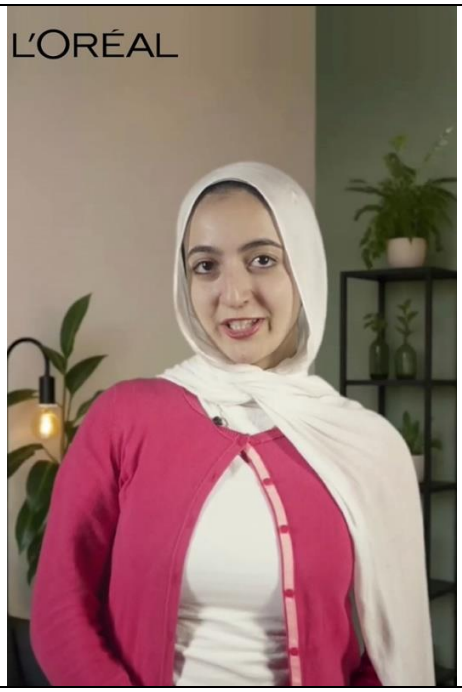
2017).

Experimental:

An experiment was conducted to test hypotheses by creating three deepfake advertisements. The study utilized a questionnaire adapted from (Chesney & Citron 2019, Kaplan& Haenlein 2020, Wardle& Derakhshan 2017, Cook et.al, 2017), administered both before and after the presentation of these ads on Facebook to assess their impact on users. The initial sample included 150 participants randomly selected from the Facebook platform (aged 20 to 40 years). However, 22 respondents were excluded due to incomplete responses, resulting in a final sample of 128 participants, comprising 60% men and 40% women.

Figure (9) presents the concept of the first advertisement, which revolves around the "Healthy and Tasty" brand of health products. The idea employs deepfake technology to transform a person's image into an overweight version of themselves, illustrating the consequences of consuming unhealthy food. This serves as a compelling call to action, encouraging the adoption of healthier product choices.

Figure (10) presents the concept of the Second advertisement, which focuses on raising awareness about the dangers of using earphones to listen to music and other audio content. The idea utilizes deepfake technology to show the potential long-term impact on hearing, illustrating how excessive use can lead to significant hearing loss and eventually require the use of hearing aids.



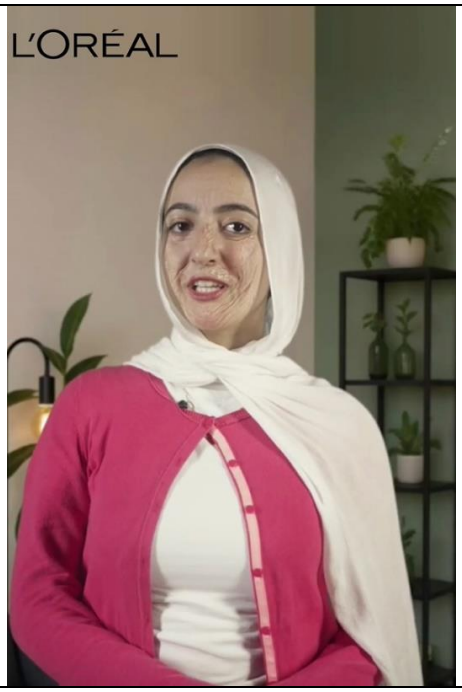


Figure (١١) presents the concept of the third advertisement, which uses deepfake technology to promote L'Oréal's anti-aging products. The concept highlights how the product helps reduce the appearance of wrinkles and signs of aging, offering a more youthful and revitalized look.

Stimuli:

Three ads were designed using deepfake technology. The first ad is for the company Healthy & Tasty, which offers healthy meals to control calorie intake. The ad shows the user after consuming more calorie-laden meals, depicting significant weight gain that alters their appearance. The second ad targets young people who use earphones to listen to loud music, raising awareness about the dangers of high volume on hearing. It shows the user using earphones to address hearing loss. The third ad conveys a message showing the effects of not using L'Oréal's anti-aging face creams. It presents the user's face after 20 years, showing signs of aging when the product is not used, to convince them of the product's importance.

Statistical Methods for Research Processing:

The data were analyzed using the Statistical Package for the Social Sciences (SPSS V.25), and the results were extracted based on the following statistical methods:

1- **Pearson Correlation Coefficient:** Used to verify the internal consistency validity of the research instrument.
2- **Cronbach's Alpha Coefficient:** Used to verify the reliability of the research instrument.
3- **Calculation of the Mean for Each Statement:** Used to determine the level of agreement on each statement in the questionnaire as follows:

Numerical Rating

The numerical rating is calculated as follows:

Numerical Rating=(K1×5)+(K2×4)+(K3×3)+(K4×) + (K5×1)\ text{Numerical Rating} = (K1 \times 5) + (K2 \times 4) + (K3 \times 3) + (K4 \times 2) + (K5\ times 1) Numerical Rating= (K1×5)+ (K2×4) + (K3×3) + (K4×2)+(K5×1)

Where K1,K2,K3,K4,K1, K2, K3, K4, K1, K2, K3, K4, and K5K5K5 represent the frequency of responses for the categories (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree), respectively. NNN refers to the sample size. Statements are then ranked based on the mean score for each statement.

- **Chi-Square (χ^2) Test for Goodness of Fit:** Applied to each statement to identify differences in the responses of the study sample to the five response options (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree).
- **Range Equation:** To describe the mean scores of responses for each statement on the five-point Likert scale, the degree of response for each statement is determined as follows:
- **Positive Statements:**
  - Score (5) for Strongly Agree
  - Score (4) for Agree
  - Score (3) for Neutral
  - Score (2) for Disagree
  - Score (1) for Strongly Disagree
  - Interpretation of the mean value:
    - 1 to less than 1.80: Strongly Disagree
    - 1.80 to less than 2.60: Disagree
    - 2.60 to less than 3.40: Neutral
    - 3.40 to less than 4.20: Agree
    - 4.20 to 5.00: Strongly Agree

- **Negative Statements:**
  - Score (5) for Strongly Disagree
  - Score (4) for Disagree
  - Score (3) for Neutral
  - Score (2) for Agree
  - Score (1) for Strongly Agree
  - Interpretation of the mean value:
    - 1 to less than 1.80: Strongly Agree
    - 1.80 to less than 2.60: Agree
    - 2.60 to less than 3.40: Neutral
    - 3.40 to less than 4.20: Disagree
    - 4.20 to 5.00: Strongly Disagree

T-Test: Used to identify differences between the mean scores of the research sample's responses in the pre-test and post-test applications.

Eta-Squared (η^2) Formula: Used to measure the effect size of advertisements on the awareness level of the research sample regarding the use of deepfake technology.

Validity and Reliability of the Questionnaire

Questionnaire Validity:

Expert Validity:

The initial version of the questionnaire was presented to (15) experts from the academic staff specializing in the field to ensure its suitability and validity for measuring its intended objectives. The experts were asked to provide feedback on:

- The clarity and appropriateness of the questionnaire's statements.
- The clarity of the questionnaire's instructions.
- The clarity and relevance of the response options.
- The consistency of the statements within each dimension with the aspects they aim to measure.
- Suggestions for modification, deletion, or addition of items as needed.
- Based on the experts' feedback, the researcher made the necessary adjustments, and the questionnaire was finalized in its current form.

Internal Consistency Validity:

The researcher verified the internal consistency validity of the questionnaire by calculating the correlation coefficients between the scores of each statement and the total scores of the section to which the statement belongs. The results are detailed as shown in:

First Section		Second Section		Third Section		Fourth Section	
Phrase Number	Correlation Coefficient	Phrase Number	Correlation Coefficient	Phrase Number	Correlation Coefficient	Phrase Number	Correlation Coefficient
1	**0.784	11	**0.692	21	**0.62	31	**0.701
2	**0.814	12	**0.708	22	**0.576	32	**0.715
3	**0.577	13	**0.721	23	**0.595	33	**0.536
4	**0.426	14	**0.578	24	**0.724	34	**0.53
5	**0.58	15	**0.591	25	**0.698	35	**0.623
6	**0.749	16	**0.638	26	**0.694	36	**0.655
7	**0.464	17	**0.67	27	**0.632	37	**0.514
8	**0.576	18	**0.7	28	**0.589	38	**0.637
9	**0.56	19	**0.729	29	**0.6	39	**0.515
10	**0.599	20	**0.57	30	**0.557	40	**0.575

Table (1): Correlation coefficients between the scores of each questionnaire statement and the total scores of the section it belongs to

Significance at the Level (0.01):

Table (1) shows a statistically significant correlation between the scores of each questionnaire item and the total scores of the section to which the item belongs. The correlation coefficients ranged from 0.426 to 0.814, indicating that the questionnaire items are valid and measure what they are intended to assess.

Construct Validity:

The researcher assessed the construct validity of the questionnaire by calculating the correlation coefficients between the scores of each section and the total scores of the questionnaire. The results are presented in the following table

Correlation Coefficient	Sections
First Section	**0.708
Second Section	**0.587
Third Section	**0.722
Fourth Section	**0.664

Table (2): Correlation coefficients between the scores of each section and the total scores of the questionnaire

Significance at the Level (0.01):

Table (2) indicates a statistically significant correlation between the scores of each section of the questionnaire and the total scores of the questionnaire, with correlation coefficients ranging from 0.587 to 0.722. This demonstrates the validity and consistency of the questionnaire's sections.

Reliability Results of the Questionnaire and Its Sections:

The reliability of the questionnaire and its sections was assessed using Cronbach's Alpha coefficient. The results are detailed in Table (3):

Sections	Phrases	Cronbach's alpha coefficient
First Section	10	0.811
Second Section	10	0.832
Third Section	10	0.822
Fourth Section	10	0.779
The questionnaire as a whole	40	0.868

Table (3): Cronbach's Alpha coefficient for the questionnaire and its dimensions.

Table (3) presents the reliability coefficients for the questionnaire and its sections, with values ranging from 0.779 to 0.832 for the sections, and 0.868 for the overall questionnaire. These reliability values are considered acceptable, providing reassurance to the researcher regarding the reliability of the questionnaire's results.

Results of the Field Study and Their Interpretation:

Results of Testing the First Hypothesis:

The first hypothesis states: "Advertisements using deepfake technology will generate higher user engagement compared to traditional advertisements."

To test this hypothesis, the researcher calculated the means, standard deviations, and levels of agreement for the items in the first section of the questionnaire. The paired samples t-test was then used to assess the differences in the mean scores of the responses in the pre-test and post-test applications of the first section of the questionnaire. The results are as follows:

Section 1: Comparison of Deepfake Advertisements and Traditional Advertisements:

Num	Phrases	Pre- Application				Post-Application				Value (t)	Level of significance
		Rank	Level	Standard Deviati	Mean	Rank	Level of Agreement	StandardDevi	Mean		
1	Deepfake-based advertisements appear to be more persuasive than traditional advertisements.	2	N/A	1.39	2.61	1	Strongly agree	0.68	4.68	15.17	0.001
2	I am less inclined to engage with innovative advertising content that utilizes deepfake technology.	9	agree	0.86	1.81	2	Strongly Disagree	0.68	4.57	29.15	0.001
3	Advertisements using deepfake technology capture my attention more effectively than traditional ads.	4	Disagree	0.81	1.85	3	Strongly agree	0.70	4.57	27.24	0.001
4	I do not find advertisements leveraging deepfake technology to be more visually appealing.	8	agree	0.78	1.80	6	Strongly Disagree	0.73	4.44	28.31	0.001
5	Deepfake-powered advertisements appear more realistic and credible to me.	10	Strongly Disagree	0.60	1.30	8	agree	0.91	4.13	27.32	0.001

Num	Phrases	Pre- Application				Post-Application				Value (t)	Level of significance
		Rank	Level	Standard Deviati	Mean	Rank	Level of Agreement	StandardDevi	Mean		
6	I believe that deepfake technology adds a new dimension of value to the advertising viewing experience.	7	Disagree	0.80	1.82	10	N/A	1.05	3.39	14.11	0.001
7	Traditional advertisements seem more impactful compared to those utilizing deepfake technology.	6	agree	0.77	1.83	7	Disagree	0.85	4.34	24.04	0.001
8	I am more likely to share advertisements that use deepfake technology on social media platforms.	1	N/A	1.11	2.63	5	Strongly agree	0.78	4.48	15.01	0.001
9	Deepfake-based advertisements pique my interest enough to make me want to learn more about the product or service.	5	Disagree	0.85	1.84	9	agree	0.93	4.01	18.79	0.001
10	I do not feel that the use of deepfake technology in advertisements makes them more engaging or personalized for me.	3	agree	0.84	1.86	4	Strongly Disagree	0.84	4.52	25.86	0.001

Table (4) shows the responses of the research sample to the items in the first section of the questionnaire in both the pre-test and post-test applications, which are as follows

- **Before viewing the advertisements:** The response levels of the research sample ranged from Neutral, Disagree, and Strongly Disagree for the positive statements, and Agree for the negative statements. The mean values for the items ranged from 1.30 to 2.63. The item ranked first among the items in the first section was Item 8, which states: "I am more willing to share advertisements that use deepfake technology on social media." with a mean of 2.63 and a "Neutral" rating.
- **The second-ranked item was Item 1, which states:** "Advertisements using deepfake technology seem more convincing than traditional advertisements," with a mean of 2.61 and a "Neutral" rating.
- **The third-ranked item was Item 10, which states:** "I do not feel that using deepfake technology in advertisements makes them more interactive and personal for me," with a mean of 1.86 and an "Agree" rating.
- **Item 2, which states:** "I am not inclined to interact with advertisements with innovative content using deepfake technology," was ranked ninth, just before the last, with a mean of 1.81 and an "Agree" rating.
- **Item 5, which states:** "Advertisements that rely on deepfake technology seem more realistic and credible," was ranked tenth and last among the items in the first section, with a mean of 1.30 and a "Strongly Disagree" rating.
- **After viewing the advertisements:** The response levels of the research sample ranged from Strongly Agree, Agree, and Neutral for the positive statements, and Strongly Disagree, Disagree for the negative statements. The mean values for the items ranged from 3.39 to 4.68. The item ranked first in the first section was Item 1, which states: "Advertisements using deepfake technology seem more convincing than traditional advertisements," with a mean of 4.68 and a "Strongly Agree" rating.
- **The second-ranked item was Item 2, which states:** "I am not inclined to interact with

advertisements with innovative content using deepfake technology," with a mean of 4.57 and a "Strongly Disagree" rating.

- **The third-ranked item was Item 3, which states:** "Deepfake-based advertisements attract my attention more than traditional advertisements," with a mean of 4.57 and a "Strongly Agree" rating.
- **Item 9, which states:** "Deepfake-based advertisements generate enough interest for me to want to learn more about the product or service," ranked ninth, just before the last, with a mean of 4.01 and an "Agree" rating.
- **Item 6, which states:** "I believe that deepfake technology adds new value to the advertising experience," ranked tenth and last in the first section, with a mean of 3.39 and a "Neutral" rating.
- **T-Test Results:** There were statistically significant differences between the mean scores of the research sample's responses on the first section of the questionnaire regarding the comparison between deepfake and traditional advertisements in the pre-test and post-test applications, favoring the post-test. The t-values for the items ranged from 14.11 to 29.15, all significant at the 0.001 level.

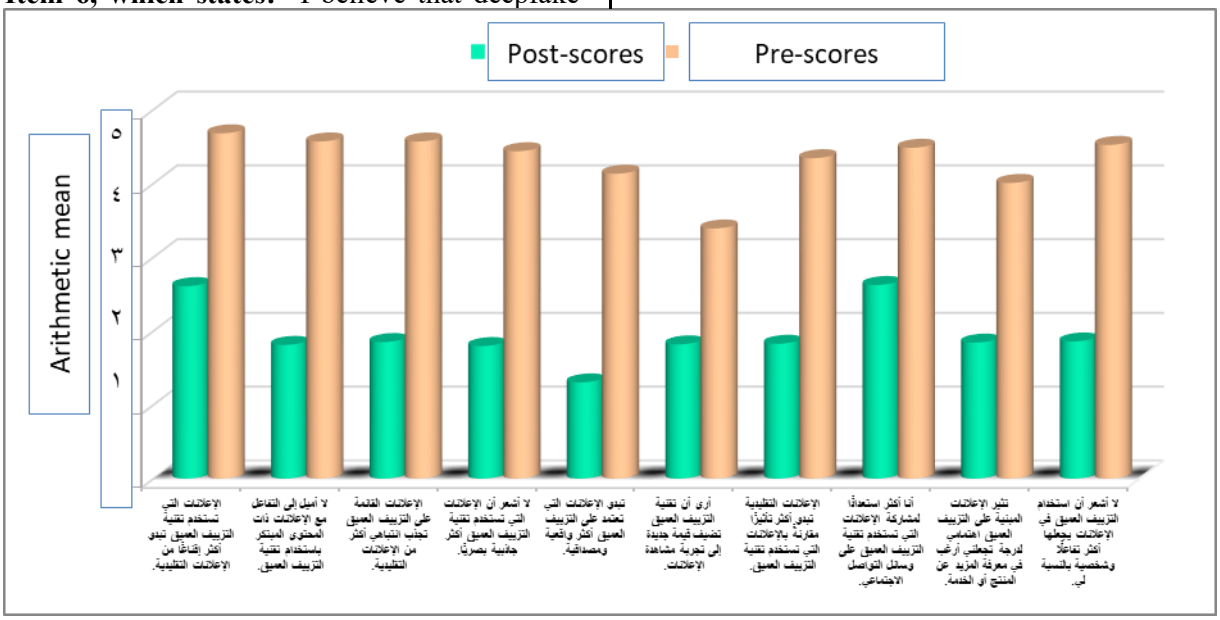


Figure (12) illustrates the mean values of the first section items before and after viewing the advertisements.

From Table (1) and its results, as well as Figure (12), it is evident that the first hypothesis of the research has been confirmed.

Results of Testing the Second Hypothesis:

The second hypothesis states: "Virtual Personas created using deepfake technology will be perceived as more relatable and interactive by users compared to real human characters in advertisements."

To test this hypothesis, the researcher calculated the means, standard deviations, and levels of agreement for the items in the second section of the questionnaire. The paired samples t-test was used to assess the differences in the mean scores of the responses in the pre-test and post-test applications of the second section of the questionnaire. The results are as follows:

Section 2: Awareness of Deepfake Technology in Advertisements and Reactions to It

Num	Phrases	Pre- Application				Post-Application				Value (t)	Level of significance
		Rank	Level	Standard Deviation	Mean	Rank	Level of Agreement	Standard Deviation	Mean		
2	I am aware that deepfake technology is increasingly used in the advertising industry.	6	Strongly Disagree	0.63	1.83	6	agree	1.02	4.16	26.15	0.001
2	I cannot easily identify advertisements that rely on deepfake technology.	4	agree	0.76	1.81	10	N/A	1.04	3.34	13.10	0.001

Num	Phrases	Pre- Application				Post-Application				Value (t)	Level of significance
		Rank	Level	Standard Deviation	Mean	Rank	Level of Agreement	Standard Deviation	Mean		
3	The presence of deepfake technology in advertisements raises questions about the credibility of the presented content.	3	Disagree	0.81	1.83	8	Disagree	1.04	4.13	19.45	0.001
4	I do not support the use of deepfake technology in advertisements, even if it enhances content quality.	2	N/A	1.10	2.26	1	Strongly Disagree	0.67	4.70	16.78	0.001
5	I believe that using deepfake technology in advertisements may mislead audiences.	7	Strongly agree	0.51	1.30	7	Disagree	0.95	4.15	29.67	0.001
6	I see deepfake as a creative and beneficial tool in the field of marketing and advertising	9	Strongly Disagree	0.42	1.20	9	N/A	1.06	3.38	22.30	0.001
7	The use of deepfake technology in advertisements makes me concerned about privacy violations.	5	Strongly Disagree	0.60	1.39	2	Strongly agree	0.76	4.65	39.16	0.001
8	I believe deepfake technology in advertisements could impact public trust in brands.	8	Strongly Disagree	0.52	1.22	4	Strongly agree	0.75	4.59	42.61	0.001
9	I am more willing to engage with advertisements if I know they use deepfake technology responsibly.	10	Strongly Disagree	0.47	1.17	5	Strongly agree	0.74	4.56	43.56	0.001
10	I do not feel the need for strict regulation of the use of deepfake technology in advertisements.	1	N/A	1.00	2.62	3	Strongly Disagree	0.67	4.60	21.39	0.001

Table (5) shows the responses of the research sample to the items in the second section of the questionnaire in both the pre-test and post-test applications. The results are as follows:

Before Viewing the Advertisements:

The response levels of the sample members ranged between "Disagree" and "Strongly Disagree" for the positive items, and "Strongly Agree," "Agree," and "Neutral" for the negative items. The mean scores for the items ranged between (1.17 – 2.62). The item No. 20 ("I don't feel the need for strict regulation on the use of deepfake technology in advertisements") ranked first with a mean score of (2.62) and a "Neutral" rating. This was followed by item No. 14 ("I do not support the use of deepfake technology in advertisements if it enhances content quality"), with a mean score of (2.62) and a "Neutral" rating. Item No. 13 ("The presence of deepfake technology in advertisements raises questions about the credibility of the presented content") ranked third with a mean score of (1.83) and a "Disagree" rating. Meanwhile, item No. 16 ("I believe deepfake technology can be a creative and useful tool in marketing and advertising")

ranked ninth with a mean score of (1.20) and a "Strongly Disagree" rating. Finally, item No. 19 ("I am more willing to interact with advertisements if I know they use deepfake technology responsibly") ranked last with a mean score of (1.17) and a "Strongly Disagree" rating.

After Viewing the Advertisements:

The response levels of the sample members ranged between "Strongly Agree," "Agree," and "Neutral" for the positive items, and "Strongly Disagree" and "Disagree" for the negative items. The mean scores for the items ranged between (3.34 – 4.70). Item No. 14 ("I do not support the use of deepfake technology in advertisements if it enhances content quality") ranked first with a mean score of (4.70) and a "Strongly Disagree" rating. This was followed by item No. 17 ("Using deepfake technology in advertisements makes me feel concerned about privacy violations"), with a mean score of (4.65) and a "Strongly Agree" rating. Item No. 20 ("I don't feel the need for strict regulation on the use of deepfake technology in advertisements") ranked third with a mean score of (2.60) and a "Strongly Disagree" rating. Meanwhile, item No. 16 ("I believe deepfake technology can be a creative and useful tool in marketing and advertising") ranked ninth with a mean score of (3.38) and a "Neutral" rating. Finally, item No. 12 ("I cannot easily recognize advertisements that rely on deepfake technology") ranked last with a mean score of (3.34) and a "Neutral" rating.

Results of the t-test:

The t-test revealed significant differences in the mean scores of the sample members' responses to the items in the second section of the questionnaire related to awareness of deepfake technology in advertisements and reactions to it between the pre-test and post-test applications. These differences favored the post-test application, with t-values ranging from (13.10 – 43.56), all significant at the 0.001 level.

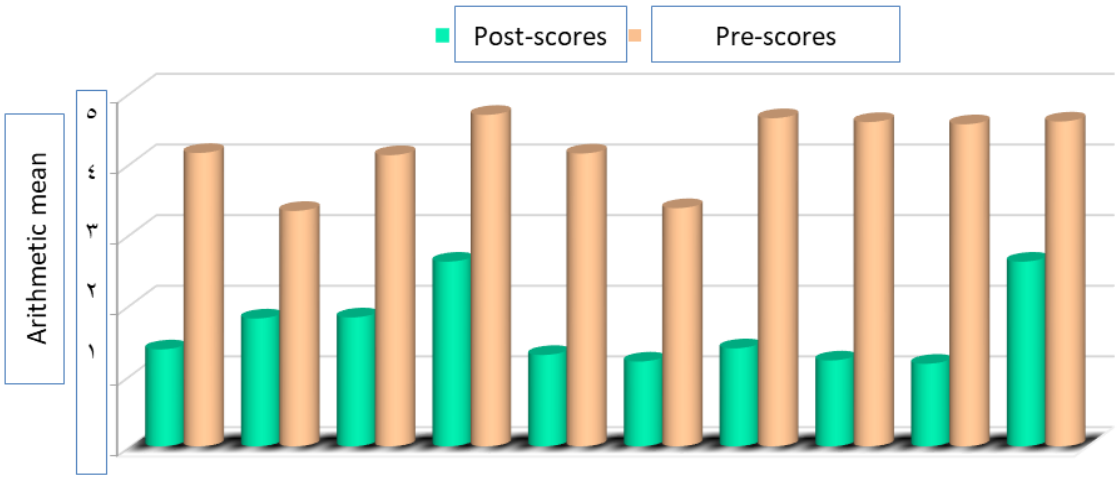


Figure (13) illustrates the mean scores of the items in the second section before and after viewing the advertisements.

Based on Table (5), the results, and Figure (13), the second hypothesis of the research is confirmed. This hypothesis states that "virtual characters created using deepfake technology will be perceived as more engaging and interactive by users compared to real human characters in advertisements." The statistical evidence supports this hypothesis, as significant differences were found between the pre-test and post-test responses, favoring the post-test, indicating that the use of deepfake technology in advertisements had a positive effect on users' perceptions of the advertisements and their engagement with them.

To verify the third hypothesis of the research, which states: "Advertisements featuring virtual Personas created using deepfake technology will elicit stronger emotional responses from users compared to those using traditional advertising methods," the researcher calculated the means, standard deviations, and approval levels for the items in the third section of the questionnaire. The researcher used the paired-sample t-test to examine the significance of the differences between the pre-test and post-test mean scores for the responses of the study sample.

The results were as follows:

Section 3: Emotional Responses to Deepfake Advertisements and Traditional Advertising Methods:

Table (6): Presents the mean scores, standard deviations, and t-test results for the responses of the study sample to the items in the third section of the questionnaire before and after viewing the advertisements.

The results will show whether the emotional responses to deepfake advertisements are statistically significant compared to traditional advertisements, supporting or refuting the hypothesis.

Num	Phrases	Pre- Application				Post-Application				Value (t)	Level of significance
		Rank	Level	Standard Deviati	Mean	Rank	Level of Agreement	StandardDeviation	Mean		
1	Virtual characters in deepfake-based advertisements appear to express emotions more than real characters.	9	Strongly Disagree	0.56	1.23	5	agree	0.86	4.19	33.01	0.001
2	I do not feel a stronger emotional impact when watching advertisements using innovative virtual characters.	8	Strongly agree	0.60	1.25	4	Strongly Disagree	0.51	4.64	50.10	0.001
3	Advertisements featuring virtual characters seem more capable of grabbing my attention and stirring my emotions.	10	Strongly Disagree	0.59	1.22	10	N/A	1.06	3.27	18.23	0.001
4	Virtual characters in advertisements make the story or message more impactful for me.	3	Disagree	0.93	1.84	7	agree	0.87	4.13	23.05	0.001
5	I do not find that virtual characters evoke more empathy compared to real characters.	4	agree	0.86	1.82	3	Strongly Disagree	0.45	4.73	35.19	0.001
6	I am more likely to remember advertisements that feature virtual characters created using deepfake technology.	5	agree	0.86	1.81	6	Disagree	0.99	4.14	19.56	0.001
7	Virtual characters make the advertisement more creative and engaging for me.	7	Strongly Disagree	0.68	1.34	8	agree	0.90	4.09	28.25	0.001
8	I feel that virtual characters in advertisements give the content a futuristic and new vibe.	6	Strongly Disagree	0.67	1.41	9	N/A	1.06	3.37	18.01	0.001
9	Using virtual characters in advertisements makes them less emotionally impactful compared to traditional advertisements.	2	agree	0.86	1.86	2	Strongly Disagree	0.43	4.76	37.39	0.001
10	I find that virtual characters enhance my emotional connection to the product or brand being advertised	1	N/A	1.28	2.61	1	Strongly agree	0.38	4.83	19.72	0.001

Table (6) shows the responses of the research sample to the items in the third section of the questionnaire in both the pre-test and post-test as follows:

- **Before watching the advertisements:**

The response levels of the research sample ranged between (Neutral, Disagree, Strongly Disagree) for the positive items, and (Strongly Agree, Agree) for the negative items.

The mean values of the items ranged between (1.22 – 2.61).

Item number (30), which states "I find that virtual characters enhance my emotional connection to the product or brand being advertised," ranked first among the items in section three with a mean value of (2.61) and a "Neutral" rating.

Item number (29), which states "Using virtual characters in advertisements makes them less emotionally impactful compared to traditional advertisements," ranked second with a mean value of (1.86) and an "Agree" rating.

Item number (24), which states "Virtual characters in advertisements make the story or advertising message more impactful for me," ranked third with a mean value of (1.84) and a "Disagree" rating.

Meanwhile, item number (21), which states "Virtual characters in advertisements created with deepfake technology seem more expressive of emotions than real characters," ranked ninth with a mean value of (1.23) and a "Strongly Disagree" rating.

Item number (23), which states "Advertisements featuring virtual characters seem more capable of capturing my attention and stirring my emotions," ranked tenth with a mean value of (1.22) and a "Strongly Disagree" rating.

- **After watching the advertisements:**

The response levels of the research sample ranged between (Strongly Agree, Agree, Neutral) for the positive items, and (Strongly Disagree, Disagree) for the negative items.

The mean values of the items ranged between (3.27 – 4.83).

Item number (30) ranked first with a mean value of (4.83) and a "Strongly Agree" rating.

Item number (29) ranked second with a mean value of (4.76) and a "Strongly Agree" rating.

Item number (25), which states "I don't find that virtual characters evoke a greater feeling of empathy compared to real characters," ranked third with a mean value of (4.73) and a "Strongly Disagree" rating.

Item number (28), which states "I feel that virtual characters in advertisements give a futuristic and fresh touch to the content," ranked ninth with a mean value of (3.37) and a "Neutral" rating.

Item number (23) ranked tenth with a mean value of (3.34) and a "Neutral" rating.

- **T-Test Results:**

Statistically significant differences were found between the mean responses of the research sample on the third section items related to emotional responses to both deepfake and traditional advertising methods in the pre-test and post-test, favoring the post-test.

The t-values for the items ranged between (18.01 – 50.10), all of which were significant at a significance level of (0.001).

Figure (14) shows the means of the third section items before and after watching the advertisements.

From Table (6) and its results, along with Figure (14), it is evident that the third hypothesis of the research has been confirmed.

Results of the Fourth Hypothesis Test:

The fourth hypothesis states that "ethical concerns and awareness of deepfake technology will modify the relationship between the use of deepfakes in advertisements and user engagement, where higher awareness will lead to decreased engagement."

To verify the validity of this hypothesis, the researcher calculated the means, standard deviations, and agreement levels for the fourth section items in the questionnaire. The "t-test" for related samples was applied to test the differences between the mean responses in the pre- and post-tests of the fourth section items. The results were as follows:

Section Four: Awareness of Deepfake Technology in Advertisements and Reactions to It:

Num	Phrases	Pre- Application				Post-Application				Value (t)	Level of significance
		Rank	Level	Standard Deviation	Mean	Rank	Level of Agreement	Standard Deviation	Mean		
1	The use of deepfake technology in advertisements raises significant ethical concerns.	8	Disagree	0.90	1.81	4	Strongly agree	0.65	4.67	32.55	0.001
2	Brands should disclose the use of deepfake technology in their advertisements.	4	Disagree	0.89	1.85	1	Strongly agree	0.50	4.76	33.70	0.001
3	Deepfake advertisements can easily mislead consumers.	6	agree	0.91	1.83	9	N/A	1.21	3.30	11.57	0.001
4	Virtual characters cannot unfairly exploit consumers' emotions.	2	N/A	1.20	2.63	2	Strongly Disagree	0.43	4.75	18.75	0.001
5	I trust brands less when they use deepfake technology in their advertisements.	10	Strongly Disagree	0.69	1.33	8	N/A	1.09	3.38	17.77	0.001
6	The use of undisclosed deepfake advertisements should be regulated or banned.	5	Disagree	0.84	1.84	10	N/A	1.24	3.26	10.06	0.001
7	The ethical implications of deepfake advertisements outweigh their benefits.	1	N/A	1.10	2.63	5	Strongly agree	0.74	4.66	2.01	0.001
8	Deepfake advertisements are more likely to manipulate consumer behavior compared to traditional advertisements.	7	Disagree	0.85	1.82	7	Strongly agree	0.49	4.63	34.71	0.001
9	Transparency regarding the use of deepfake technology can improve trust in advertisements.	3	N/A	1.34	2.61	6	Strongly agree	0.48	4.65	16.16	0.001
10	I am concerned about the potential misuse of deepfake technology beyond advertising.	9	Strongly agree	0.72	1.43	3	Strongly Disagree	0.46	4.70	45.17	0.001

Table (7) illustrates the responses of the sample members to the items in Section Four of the questionnaire in both the pre- and post-tests as follows:

Before viewing the ads: The response levels of the sample members ranged between (Neutral, Disagree, Strongly Disagree) for the positive statements, and (Strongly Agree, Agree, Neutral) for the negative statements. The mean values for the statements ranged from (1.33 to 2.63). Statement (37), which says, "The ethical implications of deepfake ads outweigh their benefits," ranked first in Section Four with a mean of (2.63) and a "Neutral" response. This was followed by statement (34), which says, "Virtual characters cannot unfairly exploit consumer emotions," also ranked second with a mean of (2.63) and a "Neutral" response. Then, statement (39), which says, "Transparency about the use of deepfakes can improve trust in advertisements," ranked third with a mean of (2.61) and a "Neutral" response. Meanwhile, statement (40), which says, "I feel concerned about the potential misuse of deepfake technology beyond advertising," ranked ninth with a mean of (1.43) and a "Strongly Agree" response, while statement (35), which says, "I trust brands less when they use deepfake technology in their ads," ranked tenth and last with a mean of (1.33) and a "Strongly Disagree" response.

After viewing the ads: The response levels of the sample members ranged between (Strongly Agree, Neutral) for the positive statements, and (Strongly Disagree, Neutral) for the negative statements. The mean values for the statements ranged from (3.26 to 4.76). Statement (32), which says, "Brands must disclose the use of deepfake technology in their ads," ranked first in Section Four with a mean of (4.76) and a "Strongly Agree" response. This was followed by statement (34), which says, "Virtual characters cannot unfairly exploit consumer emotions," ranked second with a mean of (4.75) and a "Strongly Agree" response. Then, statement (40), which says, "I feel concerned about the potential misuse of deepfake technology beyond advertising," ranked third with a mean of (4.70) and a "Strongly Agree" response. Meanwhile, statement (33), which says, "Deepfake ads can easily mislead consumers," ranked ninth with a mean of (3.26) and a "Neutral" response, while statement (36), which says, "The use of deepfake ads should be regulated or banned unless disclosed," ranked tenth and last with a mean of (3.30) and a "Neutral" response.

T-Test Results: The T-test results indicated significant differences in the mean responses between the pre- and post-tests of Section Four items related to awareness of deepfake technology in advertisements and reactions to it, favoring the post-test. The T-values for the statements ranged from (10.06 to 45.17), all of which were significant at the (0.001) level.

Figure (15) illustrates the mean values for the items in Section Four before and after viewing the ads.

Based on Table (7) and the results presented in Figure (15), the fourth hypothesis of the research has been validated.

Results of the Fifth Hypothesis Test:

The fifth hypothesis states, "The intersection of personalization and manipulation in deepfake advertising achieves a greater impact on user engagement and connection."

To validate this hypothesis, the researcher used the Eta-squared (η2\eta^2η2) formula to measure the effect size of deepfake advertisements on user engagement and connection with these ads compared to traditional advertisements. Cohen provided a guideline for interpreting the "effect size," where it is considered small if the value of η2\eta^2η2 is (0.01), moderate if it is (0.06), and large if it is (0.14). The results are as follows:

Sections	Pre-Application		Post-Application		T-Value	Significance Level	Eta Squared h2
	Mean	Standard Deviation	Mean	Standard Deviation			
Comparison of Deepfake Advertisements and Traditional Advertisements	1.94	0.35	4.31	0.33	57.53	0.001	0.963
Awareness of Deepfake Technology in Advertising and Reactions to It	1.65	0.27	4.22	0.33	63.39	0.001	0.969
Emotional Responses to Both Deepfake Advertisements and Traditional Advertising Methods	1.64	0.34	4.21	0.29	66.63	0.001	0.972
Ethical Concerns and Trust	1.98	0.46	4.27	0.27	53.16	0.001	0.957
Overall Evaluation	1.80	0.24	4.26	0.16	95.99	0.001	0.986

Table (8): The effect of deepfake advertisements on user engagement and connection with this type of advertisement compared to traditional advertisements.

Table (8) shows the Eta-squared (η2\eta^2η2) values used to measure the effect size of deepfake advertisements on user engagement and connection with this type of advertisement compared to traditional advertisements. The Eta-squared values for the sections of the questionnaire ranged between (0.963 – 0.972), with the overall effect size reaching (0.986). These values are greater than the threshold of 0.14 set by Cohen for a large effect size. This indicates that the impact of deepfake advertisements presented to the respondents was large, leading to significant engagement and connection from the respondents compared to traditional advertisements.

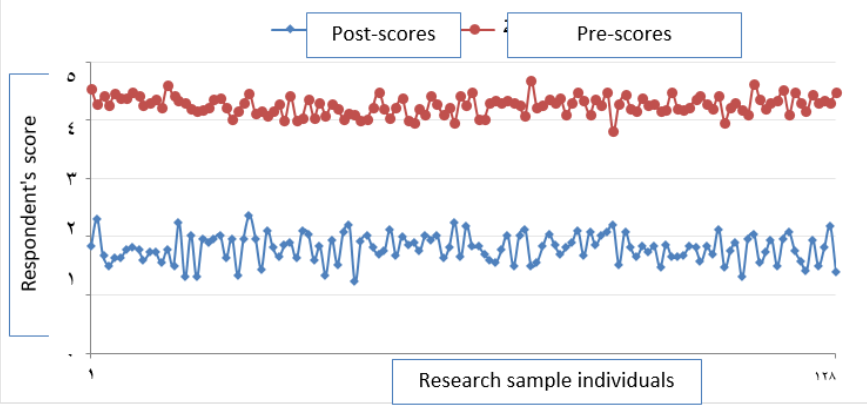


Figure (16) illustrates the mean scores of the research sample in the pre- and post-application of the questionnaire (overall evaluation).

From Table (8), its results, and Figure (16), it is evident that the fifth hypothesis of the research has been validated.

Discussion:

The results of this field study offer intriguing insights into the potential of deepfake technology in advertising and its influence on user engagement, emotional responses, and perceptions of virtual personas. These findings provide a unique lens through which the efficacy and ethical concerns of deepfake advertisements can be understood.

- **Higher User Engagement with Deepfake Advertisements:** The first finding that advertisements using deepfake technology generate higher user engagement compared to traditional advertisements suggests that the enhanced realism and personalization offered

by deepfakes have a significant impact on audience interaction. This could be due to the ability of deepfakes to craft more personalized and contextually relevant content, making the advertisement feel more tailored and immediate. Moreover, the novelty and technological sophistication behind deepfake advertising likely pique user curiosity, increasing the likelihood of engagement.

- **Perception of Virtual Characters as Relatable and Interactive:** The second result that virtual characters created using deepfake technology are perceived as more relatable and interactive than real human characters highlights a shift in consumer behavior. It is possible that the level of customization achievable through deepfake technology allows virtual personas to resonate more with individuals by reflecting their desires, preferences, or even social media presence. This could also be a result of the seamless integration of virtual characters into real-world contexts, making them appear more flexible and responsive to user actions. Furthermore, virtual characters can be designed to embody idealized traits or attributes, which may increase their relatability for certain target audiences.
- **Stronger Emotional Responses from Virtual Personas:** Deepfake advertisements eliciting stronger emotional responses compared to traditional advertisements can be attributed to several factors. The uncanny realism of deepfake characters, combined with their ability to mimic real human emotions, likely leads to more intense emotional connections with viewers. Virtual personas can evoke empathy, joy, or even sadness by replicating familiar, relatable scenarios, which deepens user engagement. The heightened emotional response may stem from the manipulation of facial expressions, voice modulation, and other nuanced human traits that deepfake technology enables, making the interaction feel more authentic and engaging.
- **Ethical Concerns and Awareness of DT:** The result indicating that ethical concerns and awareness of deepfake technology lead to decreased engagement underscores the complexity of consumer reactions to emerging technologies. While deepfakes can significantly enhance advertising effectiveness, the awareness of their potential for manipulation, misinformation, and privacy invasion can trigger skepticism and mistrust. Users may feel uncomfortable or deceived when they recognize that the personas they are engaging with are not real, especially if they are aware of the technology behind the creation of these characters. This finding suggests that while deepfake advertisements can be highly engaging, ethical considerations and transparency must be factored into their design to maintain trust and prevent negative reactions.
- **Personalization and Manipulation in Deepfake Advertising:** The intersection of personalization and manipulation in deepfake advertisements produces a greater impact on user engagement and connection. Deepfake technology allows advertisers to craft highly personalized content that can target individual preferences and needs, leading to more tailored and effective messaging. However, this also raises concerns about the ethical implications of using such powerful technology to manipulate consumer behavior. The ability to manipulate emotions and perceptions through deeply personalized content may be seen as a form of exploitation, especially if it is used to influence vulnerable populations. Nonetheless, the combination of personalized content and the immersive qualities of deepfakes creates a unique advertising experience that drives user engagement.

Recommendations:

To mitigate the ethical challenges associated with the use of deepfake technology in advertising, it is essential to develop clear ethical guidelines and prioritize transparency in its implementation. Advertisers must disclose the use of deepfakes, allowing consumers to recognize when content has been synthetically generated. Such openness is critical for preserving consumer trust and minimizing the potential for deception or misinformation. In light of these concerns, the following recommendations are offered to support the responsible and ethical use of deepfake technology in advertising:

- **Transparency and Disclosure:** Advertisers must ensure transparency in the use of deepfake technology by clearly informing the public when it has been utilized in advertisements, such as through explicit labeling like “This advertisement was created using deepfake technology.” Additionally, when virtual personas are created using deepfake technology, it is essential to disclose whether these characters are based on real individuals or entirely synthetic. For example, if an advertisement features a persona resembling a celebrity or public figure, consumers should be made aware whether the character is a digital creation or an actual

likeness of the person. This level of transparency helps maintain trust and ensures that consumers are not misled.

- **Informed Consent: User Consent for Personalized Content:** When deepfake technology is used to tailor content based on consumer data or behavior, explicit consent should be obtained from users before they interact with such content. Advertisers must ensure that users are fully aware of and agree to personalized content based on their preferences or likeness. Also, Opt-out Mechanism: Consumers should be given the option to opt-out of receiving personalized or deepfake-based advertisements, allowing them to control their exposure to such technologies.
- **Ethical Storytelling**: Advertisements utilizing deepfake technology should focus on delivering honest, impactful narratives. The use of digital personas should not manipulate consumer emotions to prompt unnecessary purchases or actions. The ethical responsibility lies in ensuring that deepfakes are used to foster creativity and enrich storytelling, rather than deceive or create undue fear or desire.
- **Protection of Vulnerable Populations:** Safeguarding against Exploitation: Extra caution should be exercised when deepfake technology targets vulnerable groups, such as children, elderly individuals, or people facing mental health challenges. Advertisers must ensure these groups are not exploited through misleading or harmful content. Also, Age-Appropriate Content: Deepfake-based advertisements should be appropriate for all age groups and should not encourage harmful behaviors or promote unrealistic ideals.
- **Data Privacy and Protection:** Advertisers must be mindful of privacy concerns, especially when deepfake technology is combined with personalized data. It is essential to ensure that personal data is not misused to create misleading advertisements.
- **Consent for Likeness Use**: Advertisers must obtain explicit consent before using an individual's likeness in deepfake content. This includes ensuring that public figures' likenesses are not used without prior approval.
- **Avoiding Fear-based Advertising:** Fear-based advertising, especially those that leverage deepfake technology, should be avoided, as it manipulates consumer insecurities. Advertisers should ensure that their emotional appeals are balanced, avoiding the creation of unnecessary psychological pressure on audiences.
- **Collaboration with Regulatory Bodies:** Advertisers should engage with regulatory organizations to develop industry-wide standards for the ethical use of deepfake technology in advertising. These standards should cover transparency, consumer consent, privacy, and prevent deceptive practices.

References:

1- Aguirre, E., Mahr, D., Grewal, D., & Ruyter, K. (2015). Unraveling the customer experience in personalized marketing. Journal of Retailing, 91(3), 479-494.

2- Ali, S., DiPaola, D., & Breazeal, C. (2021). What are GANs? Introducing generative adversarial networks to middle school students. Proceedings of the AAAI Conference on Artificial Intelligence, 35(17), 15472 15479.

3- Anvari, F., & Richards, D. (2018). Holistic Personas and the Five-Dimensional Framework to assist practitioners in designing context-aware Accounting Information System e-Learning applications. In P. C. Vinh, N. H. H. Cuong, & E. Vassev (Eds.), Context-aware systems and applications, and nature of computation and communication: 6th International Conference, ICCASA 2017, and 3rd International Conference, ICTCC 2017, Tam Ky, Vietnam, November 23-24, 2017, Proceedings (pp. 184-194). (Lecture Notes of the Institute for Computer Sciences, Social-Informatics and Telecommunications Engineering, LNICST; Vol. (217). Springer, Springer Nature. https://doi.org/10.1007/978-3-319-77818-1_18

4- Anvari, F., Richards, D., Hitchens, M., Babar, M. A., Tran, H. M. T., & Busch, P. (2017). An empirical investigation of the influence of persona with personality traits on conceptual design. Journal of Systems and Software, 134, 324–339. doi:10.1016/j.jss.2017.09.020

5- Borji, A. (2023). Qualitative failures of image generation models and their application in detecting deepfakes. Image and Vision Computing, 137(1), https://doi.org/10.1016/j.imavis.2023.104771.

6- Campbell, C., Plangger, K., Sands, S., & Kietzmann, J. (2021). Preparing for an Era of Deepfakes and AI-Generated Ads: A Framework for Understanding Responses to Manipulated Advertising. Journal of Advertising, 1(17). doi:10.1080/00913367.2021.1909515

7- Campbell, C., Plangger, K., Sands, S., & Kietzmann, J. (2022). How deepfakes and artificial intelligence could reshape the

advertising industry: The coming reality of AI fakes and their potential impact on consumer behavior. Journal of Advertising Research, 62(3), 287-301. https://doi.org/10.2501/JAR-2022-038

8- Campbell, C., Venkatesh, V., & Sussman, E. (2020). The future of advertising: Real-time customization through artificial intelligence. Journal of Advertising Research, 60(3), 249-267.

9- Chesney, B., & Citron, D. K. (2019). Deepfakes: A looming challenge for privacy, democracy, and national security. California Law Review, 107(6), 1753-1819.

10- Cooper, A., & Saffo, P. (1999). The Persona Lifecycle: Keeping People in Mind Throughout Product Design. Interactions, 6(1), 17-23.

11- Dilrukshi Gamage, Piyush Ghasiya, Vamshi Bonagiri, Mark E. Whiting, and Kazutoshi Sasahara. 2022. Are Deepfakes Concerning? Analyzing Conversations of Deepfakes on Reddit and Exploring Societal Implications. In CHI Conference on Human Factors in Computing Systems, 1–19.

12- Giudice, O., Guarnera, L., & Battiato, S. (2021). Fighting deepfakes by detecting gan dct anomalies. Journal of Imaging, 7(8), 128.

13- Gligor, D., Bozkurt, S., Welch, E., & Gligor, N. (2022). An exploration of the impact of gender on customer engagement. Journal of Marketing Communications, 29(4), 379–402. https://doi.org/10.1080/13527266.2022.2030390

14- Goodfellow, I., Pouget-Abadie, J., Mirza, M., Xu, B., Warde-Farley, D., Ozair, S., & Bengio, Y. (2014): Generative adversarial nets. Proceedings of the 27th International Conference on Neural Information Processing Systems, 2672-2680.

15- Hayes, J. L., B. C. Britt, W. Evans, S. W. Rush, N. A. Towery, and A. C. Adamson (2021): Can Social Media Listening Platforms' Artifcial Intelligence Be Trusted? Examining the Accuracy of Crimson Hexagon's (now Brandwatch Consumer Research's) AI-Driven Analyses." Journal of Advertising 50, 1, 81–91.

16- Holzinger, M. Kargl, B. Kipperer, P. Regitnig, M. Plass, and H. Müller (2022): Personas for Artificial Intelligence (AI) an Open Source Toolbox," IEEE Access, vol. 10, pp. 23732–23747, doi: 10.1109/ACCESS.2022.3154776.

17- Ilkka Kaate , Joni Salminen Bernard Jansen, Joao Santos University of Turku, Rami Olkkonen (2023): The realness of fakes: Primary evidence of the effect of deepfake personas on user perceptions in a design task, nt. J. Human–Computer Studies, 178.

18- Jeffrey T. Hancock and Jeremy N. Bailenson. 2021. The Social Impact of Deepfakes. (2021): Cyberpsychology, Behavior, and Social Networking 24(3), 149–152. DOI:https://doi.org/10.1089/cyber.2021.29208.jth

19- Joni Salminen, Ilkka Kaate, Ahmed Mohamed Sayed Kamel, Soon-Gyo Jung, and Bernard J. Jansen (2021): How Does Personification Impact Ad Performance and Empathy? An Experiment with Online Advertising. International Journal of Human–Computer Interaction 37 (2)141–155. DOI:https://doi.org/10.1080/10447318.2020.1809246

20- Joni Salminen, Soon-Gyo Jung, Shammur Chowdhury, Sercan Sengün, and Bernard J. Jansen. (2020): Personas and Analytics: A Comparative User Study of Efficiency and Effectiveness for a User Identification Task. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems, ACM, Honolulu HI USA, 1–13. DOI:https://doi.org/10.1145/3313831.3376770

21- Kietzmann, J., Hermkens, K., McCarthy, I., & Silvestre, B (2020): The implications of artificial intelligence in advertising. Business Horizons, 63(4), 457-466.

22- Kietzmann, J., Hermkens, K., McCarthy, I., & Silvestre, B. (2020): Deepfakes and synthetic media: Implications for business, marketing, and society. Business Horizons, 63(4), 495-506.

23- Kumar S., Aravamudhan S. (2023): Investigating the Effects of Virtual Personas on Brand Image, Brand Awareness - Recent Advances and Perspectives.

24- Kwak, S. Jung, J. Salminen, M. Admad, and B. Jansen. (2018): Imaginary People Representing Real Numbers: Generating Personas from Online Social Media Data. ACM Trans. Web 12, 4 (November 2018), 1–26. DOI:https://doi.org/10.1145/3265986

25- Liansheng Wang, Lianyu Zhou, Wenxian Yang, and Rongshan Yu. (2022): Deepfakes: a new threat to image fabrication in scientific publications? Patterns 3, 5

26- loridi, L. (2018). The Fourth Industrial Revolution: A philosophical perspective. Springer.

27- Lucas Whittaker, Kate Letheren, and Rory Mulcahy (2021): The Rise of Deepfakes: A Conceptual Framework and Research Agenda for Marketing. Australasian Marketing Journal, 204–214.

DOI:https://doi.org/10.1177/1839334921999479

28- Lucas Whittaker, Kate Letheren, and Rory Mulcahy (2021): The Rise of Deepfakes: A Conceptual Framework and Research Agenda for Marketing. Australasian Marketing Journal 29, (3), 204–214. doi.org/10.1177/1839334921999479

29- Lugmayr, A., Smeds, R., & Kunzmann, R. (2021): Virtual characters and augmented reality in advertising: A new era of interactive marketing." Journal of Interactive Marketing, 54, 24-38.

30- Malik, A., Kuribayashi, M., Abdullahi, S.M., & Khan, A.N. (2022): Deepfake detection for human face images and videos: A survey. IEEE Access, 10, 18757-18775.

31- Marsden, N., & Haag, M. (2016). Avoiding Stereotyping in Personas: Strategies for More Inclusive Design. User Research Journal, 7(3), 99-110.

32- Marsden, N., & Proebster, M. (2019): Considering Multiple Identities in Personas:

33- Martin, J., & Murphy, P. (2017): Privacy concerns in personalized advertising: The consumer perspective. Journal of Business Research, 78, 112-118.

34- Martin, J., Borah, A., & Palmatier, R. (2017): Understanding the effect of personalized advertising on consumer feelings of vulnerability. Journal of the Academy of Marketing Science, 45(6), 663-680.

35- Masahiro Mori, Karl MacDorman, and Norri Kageki (2012): The Uncanny Valley [From the Field]. IEEE Robot. Automat. Mag. 19, 2 (June 2012), 98–100. DOI:https://doi.org/10.1109/MRA.2012.2192811

36- Masood, M., Nawaz, M., Malik, K.M., Javed, A., Irtaza, A., & Malik, H. (2023): Deepfakes generation and detection: State-of-the-art, open challenges, countermeasures, and way forward. Applied Intelligence, 53(4), 3974-4026.

37- Mika Westerlund (2019): The emergence of deepfake technology: A review. Technology innovation management review, 9 (11), 422-433.

38- Mike Seymour, Kai Riemer, Lingyao Yuan, and Alan Dennis (2021): Beyond deep fakes: Conceptual framework, applications, and research agenda for neural rendering of realistic digital faces.

39- Mukherjee, A., Smith, M. D., & Turri, C. (2018). The effectiveness of personalized advertising: An empirical study of consumer responses. Journal of Advertising Research, 58(4), 421-434.

40- Nielsen, J., et al. (2017). Personas: User-centered Design Techniques. Interaction Design Foundation. https://www.interaction-design.org/literature/topics/personas.

41- Okazaki, S., Mendez, F., & Miura, T. (2020). The impact of personalized advertising on consumer privacy perceptions. Journal of Interactive Marketing, 51, 42-54.

42- Plangger, K., & Montecchi, M. (2020). Consumer attitudes toward customer surveillance in personalized marketing. Marketing Science, 39(6), 1192-1209.

43- Plangger, K., & Watson, A. (2015). Ethical considerations in personalized advertising: The balancing act. Business Ethics Quarterly, 25(4), 465-486.

44- Probster, M., Nielsen, J., & et al. (2018). Designing Personas for UX: Making Personas Work for You. Journal of User Experience, 19(2), 1-7.

45- Pruitt, J., & Grudin, J. (2003). Personas. Proceedings of the 2003 Conference on Designing for User Experiences - DUX '03. doi:10.1145/997078.997089

46- Robert Chesney and Danielle Citron (2019): Deepfakes and the New Disinformation War: The Coming Age of Post-Truth Geopolitics." Foreign Affairs.

47- Salminen J., S.-G. Jung, and B. Jansen, "Intentionally Biasing User Representation? Investigating the Pros and Cons of Removing Toxic Quotes from Social Media Personas (2022): in Nordic Human-Computer Interaction Conference, https://doi.org/10.1145/3546155.3546647.

48- Schelenz, D., Segal, J., & Gal, M. (2020). Personalization in advertising: The role of big data and AI. Journal of Marketing Theory and Practice, 28(1), 58-72

49- Shekhar, S., & Marsden, N. (2018). Personas and Marginalized User Groups: Bridging the Gap in Design. Journal of Usability Studies, 13(2), 123-135.

50- Sunita Kumar and Sridharan Aravamudhan (2023): Brand Awareness - Recent Advances and Perspectives, Investigating the Effects of Virtual Personas on Brand Image, DO - 10.5772/intechopen.112704 https://www.researchgate.net/publication/375870614_Investigating_the_Effects_of_Virtual_Personas_on_Brand_Image

51- Tong, X., Luo, X., & Xu, X. (2020). Personalized advertising: The impact of customer-targeted messages on purchase

intentions. Journal of Marketing, 84(2), 37-52.
52- Turow, J., McGuigan, L., & Maris, E. (2015). The ethics of data collection in digital advertising. Journal of Business Ethics, 132(4), 779-790.
53- Usukhbayar, Binderiya. (2020). Deepfake Videos: The Future of Entertainment. 10.13140/RG.2.2.28924.62085.https://www.researchgate.net/publication/340862112_Deepfake_Videos_The_Future_of_Entertainment[Accessed: 1 May, 2024].
54- https://www.linkedin.com/pulse/deepfakes-ai-manipulation-media-navigating-new-reality-nicolas-babin-gwu8e/ [Accessed: 1 May, 2024].
55- https://www.respeecher.com/blog/impact-deepfake-technology-digital-marketing-advertising[Accessed: 12 April, 2024].
56- https://blog.emb.global/deepfakes-responsible-use/[Accessed: 18 January, 2024].